PROCEEDINGS

OF THE

Bournemouth Natural Science Society.

VOL. XX.

SESSION, 1927-28.

BRITISH MUSEUM
NATURAL HISTORY

THE PROPOSED NEW LECTURE HALL.

In March, 1913, the Society took on lease from the Education Committee a large room on the ground floor of the Municipal College, and this room had to serve the Society, which then numbered 426 members, for all purposes. The growing needs of education in the town compelled the Education Committee to terminate our tenancy in September, 1919; but they kindly allowed us to retain the room for another four months until we had found other premises. After many anxious debates and discussions of ways and means, the Council decided to buy our present premises, 39 Christchurch Road, at a cost of £3,000. The members of the Society gave their hearty support to the Council, and not only were all the Debentures taken up, but nearly every member voluntarily consented to double the annual subscription for three years. The adventure has proved an unqualified success; the number of members has largely increased, the activities of the Society have been enlarged, and the financial position is thoroughly sound.

When searching for suitable new premises in 1919, one of the greatest difficulties was to find a house which would give us a room large enough for a Lecture Hall. By taking away a partition wall at 39 Christchurch Road it was found possible to provide a hall which would serve for some years, until another and larger hall could be provided; but it was always part of the original scheme that a new Lecture Hall should be built when a suitable opportunity occurred.

During the last three or four years the Council have had numerous complaints with regard to the present hall, and attempts have been made, from time to time, to improve the ventilation. About a year ago the Council took the matter seriously in hand and appointed a Committee, consisting of the executive officers and Dr. Penrose, to go into the question and make suggestions. This Committee recommended the building of a new hall, and an appeal was issued to the members, which resulted in donations being promised by about 50 members, amounting to nearly £400. An architect was engaged to go into the whole question, and he adopted, as being the cheapest and most suitable, a scheme suggested by the Committee. This is shown on the accompanying Plan. The cost is estimated as follows :—

All builders' work to Hall proper but not including wood-block floor	£775
Extra for wood-block floor	£30
Extending present heating system	£90
Cost of entrance vestibule and connecting to present building	£120
Total	£1015

As will be seen by reference to the Plan, the new Hall would be built at the end of the present Museum, but on the ground level, and would have a separate entrance on the east side, and would be connected with the present building by means of a staircase coming into the present Library. A new passage would be built leading to the present Museum, which it is proposed to turn into the Library; this will also have the advantage of enlarging the present Curator's Room and Ladies' Cloak Room. A new Gentlemen's Cloak Room would be formed from some of the offices under the present Museum, and over the vestibule of the Hall a fireproof room would be provided for a cinematograph apparatus so that films can be shown.

In recommending the building of this new Hall, the Committee were impressed by the necessity of securing

(1) a better atmosphere during lectures,
(2) a larger floor-space, so that more comfortable chairs can be provided,
(3) a wood-block floor to do away with the noise of chairs being moved,
(4) a method of showing moving pictures.

These proposals were put before the Annual Meeting and met with general approval, and it was felt that the money could probably be raised by adopting the same method as in 1919, i.e., by asking members voluntarily to increase their subscriptions for three years, and a circular asking for such promises will probably be issued by the Council shortly.

The Council hope that the possession of a large, well-ventilated Hall with comfortable seats will greatly increase the attendances at the lectures, and will also give more opportunity for meetings of a semi-social nature, which have always been so popular with the members.

BRITISH MUSEUM
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BRITISH MUSEUM
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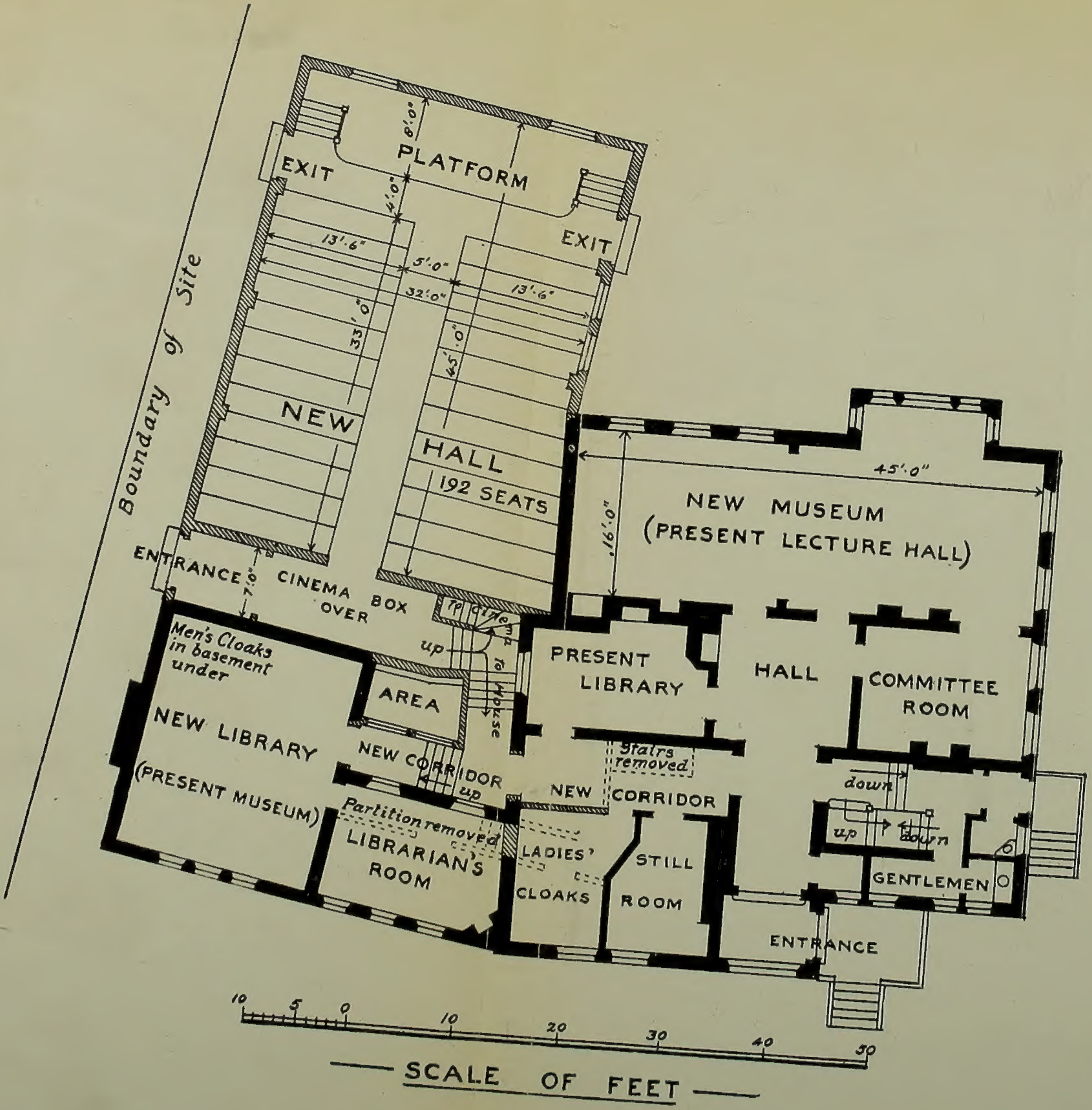
NATURAL HISTORY.


Boundary of Site
PLATFORM
8'.0"
EXIT
4'.0"
EXIT
13'.6"
5'.0"
32'.0"
13'.6"
33'.0"
45'.0"
NEW
HALL
192 SEATS
ENTRANCE
7'.0"
CINEMA BOX OVER
To Cinema
up
to House
Men's Cloaks in basement under
AREA
NEW LIBRARY
(PRESENT MUSEUM)
NEW CORRIDOR
up
Partition removed
LIBRARIAN'S ROOM
45'.0"
16'.0"
NEW MUSEUM
(PRESENT LECTURE HALL)
PRESENT LIBRARY
HALL
COMMITTEE ROOM
Stairs removed
NEW CORRIDOR
down
up
down
LADIES' CLOAKS
STILL ROOM
GENTLEMEN
ENTRANCE
10
5
0
10
20
30
40
50
SCALE OF FEET

BRITISH
MUSEUM
18 APR 29
NATURAL
HISTORY.

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Published by the Society at its House,
39 Christchurch Road, Bournemouth, 1928.

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BRITISH MUSEUM
NATURAL HISTORY

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Introductory Note.

THE Bournemouth Natural Science Society was founded in 1903, being the successor to an older society which was formed in 1883 and dissolved in 1897. The early meetings of the Society were held in a room hired from time to time for the purpose, but the need of some fixed quarters was soon felt. To meet this need a small room was taken at 122 Old Christchurch Road, and, as this proved inadequate, in February, 1909, better accommodation was secured at Granville Chambers and retained for four years. In March, 1913, the Society took on lease from the Education Committee a large room on the ground floor of the Municipal College.

ERRATA IN VOL. XIX.

Page 27. For Dr. read Mr. (Burstal).

,, 114. (Under Vice-Presidents, F. G. Penrose) for F.R.S. read F.Z.S.

,, 119. (Under Museum) Insert Chairman of Botanical Section, L. Beeching Hall, F.L.S.

During the Winter Session, from October to April, GENERAL and SECTIONAL MEETINGS are held, comprising Lectures and Demonstrations on subjects of scientific interest, illustrated by lantern slides, diagrams, specimens or experiments.

All meetings are open to all members of the Society.

Throughout the Summer Session, EXCURSIONS to places of interest in the neighbourhood are arranged and indoor or garden meetings occasionally held.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting, held in October.

The Society possesses a Library available for the use of members. This is yearly becoming more extensive and valuable by the acquisition of standard text books and of books dealing with matters of local scientific interest. Books may, under certain conditions, be borrowed by members, and there is a Reading Room in which works of reference may be consulted.

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The objects of the Society are declared by the second of its rules to be " the promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, and the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable."

The Sections at present working are as follows:—**Archæological and Historical, Astronomical, Botanical, Entomological, Geographical, Geological, Microscopical, Photographic and Record, Physical, and Zoological.**

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The Society's collections of archæological, botanical, geological, zoological and other specimens are now arranged in the MUSEUM. Articles on the collections were contributed to Vols. V. X. and XVII. of the Proceedings by Sir Daniel Morris, Mr. W. G. Wallace and Rev. C. O. S. Hatton respectively.

Members are elected by the Council and pay an annual subscription of £1 for full membership (admitting to all meetings and excursions for the year), a subscription of £2 covers four adult members of the same family residing in the same house.

A MONTHLY NOTICE, giving full details of all meetings, etc., is posted to every member before the beginning of each month, and a volume of Proceedings is published every year.

Application Forms for Membership, and further particulars, can be obtained from the

HON. SECRETARY,

Bournemouth Natural Science Society.
39 Christchurch Road,
Bournemouth.

Bournemouth Natural Science Society.

OFFICERS AND COUNCIL FOR 1927-28.

President

Heywood Sumner, F.S.A.

Vice-Presidents

Henry Backhouse, F.R.H.S.
G. E. J. Crallan, M.A., M.B., M.R.C.S.
Rev. E. F. Linton, M.A., F.L.S.
Claude Lyon
F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
R. V. Sherring, F.L.S.
Sir Daniel Morris, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.

Chairman of Council

Rev. C. O. S. Hatton, B.A., F.L.S.

Deputy-Chairman of Council

J. H. Ralph Smythe, J.P.

Council

The Officers and Chairmen of Sections (ex-officio)
Henry Backhouse, F.R.H.S.
Mrs. Curme
Col. J. R. Dodd, M.D., F.R.C.S.
J. M. French
J. B .Hurry, M.A., M.D.
F. W. Longbottom, F.R.A.S.
Miss S. G. Rooke
J. H. Scott, M.E., M.I.M.C.E.
J. H. Ralph Smythe, J.P.
J. F. Spencer
W. J. Woodhouse

Chairmen of Sections

Archæological and Historical: R. K. Cardew, B.A.
Astronomical: L. B. Benny, M.A., B.SC., F.R.A.S. (Acting Chairman).
Botanical: L. Beeching Hall, F.L.S.
Entomological: Howard Lacey, B.A.
Geographical: Claude Lyon.
Geological: Henry Bury, M.A., F.L.S., F.G.S.
Microscopical: F. B. Taylor, B.A.
Photographical and Record: W. Dieselhorst, A.M.I.C.E.
Physical: G. E. J. Crallan, M.A., M.B., M.R.C.S. (Acting Chairman).
Zoological: F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Hon. Treasurer

G. Brumell, A.R.I.B.A., Maori, 15 Richmond Park Avenue.

Secretaries

Hon. Secretary: Rev. A. G. Yates, M.A., R.N., 14 Wellington Road. to whom all official correspondence should be addressed.
Hon. Assistant Secretary: W. J. Woodhouse, A.C.P., M.I.H., 35 Chatsworth Road.
Assistant Secretary: J. F. Spencer, Glenthorne, Richmond Park Road.

Hon. Librarian

Claude Lyon, Shalimar, Wilderton Road.
Hon. Assistant Librarian : Miss A. G. Veale, 151 Richmond Park Road.

Hon. Editor

J. R. White, m.a., Whitecot, Linwood Road.

Hon. Curator

Rev. C. O. S. Hatton, b.a., f.l.s., Hinton Vicarage, Christchurch.

Hon. Auditors

E. Bicker. C. H. Blackett.

Bankers

National Provincial Bank of England, Bournemouth.

List of Members.

Revised to 5th November, 1928.

* Honorary Members. † Past Presidents. o Original Members.
G Morris Gold Medallist. a Associate Members.
The year of election is given before the name of each member.

A

1928	aAdcock, Miss, M.D., B.SC.	Newbold Verdun, Orchard Avenue, Parkstone
1927	Adkins, H.	Glenavon, 107 Alumhurst Road
1924	Amos, Miss E.	Langley Dene, 55 Wellington Road
1920	Anderson, Col. E. B., C.B.E.	Woodmanton, 35 Wellington Road
1922	Anderson, Col. R. F.	Glenalmond, 5 Madeira Road
1923	Anderson, Mrs.	,, ,, ,,
1923	Anderson, Mrs. M.	Ranfurly, 18 Dean Park Road
1914	Andrews, W.	44 Talbot Road
1926	Aston, G. R.	68 West Cliff Road
1921	Aston, Mrs.	,,
1911	Atkins, Mrs.	10 Fortescue Road
1924	Attwell, A. F., M.P.S.	17 Hamilton Road
1926	Audain, Mrs. N. M.	Rogate Lodge, Surrey Road

B

1906	Backhouse, H., F.R.H.S.	Sundridge, Grove Road
1928	Ball, Miss J. E.	Restawhile, Whitecliff Road, Parkstone
1927	Ball, W. T., O.B.E.	7 Portman Crescent
1922	Barker, S.	66 West Cliff Road
1921	Barker, Miss W.	,, ,,
1905	Barlow, E. W., B.SC., F.R.A.S., F.R. MET. S.	Greengates, Wadhurst, Sussex
1912	aBarraclough, A., M.A., F.R.G.S.	173 Richmond Park Road
1909	Barratt, J. Hayes	Brundon, 2 Surrey Road
1924	Barratt, Mrs.	,, ,,
1924	Barratt, Miss P. M.	,, ,,
1905	Bartlett, H. F. D., F.E.S.	Island of St. Helena, South Atlantic
1920	Bartlett, P. R.	35 King's Park Road
1927	Bater, G. W., B.A.	22 Dingle Road
1927	Bater, Mrs.	,, ,,
1927	Bater, Miss K. J.	,, ,,
1928	Beale, J. Bennett	Sunnycourt, Glenferness Avenue
1918	Beale, Mrs.	,, ,,
1928	Beale, Miss E. E.	,, ,,
1928	Beaumont, Miss E. G.	Cranfield, Mansfield Road, Parkstone
1918	aBeaumont, Miss E. J.	12 Sunnyhill Road, W. Southbourne
1923	Bell, Major J. G.	Ivanhoe, Sandringham Road, Parkstone
1927	Bell, S.	Bromlea, Leicester Road
1927	Bell, Mrs.	,, ,, ,,
1923	Benest, Mrs. A. S.	Tijuca, 54 Wellington Road
1904	Bennett, H. Morden	Sweet Briar, 12 Derby Road
1920	Bennett, Risdon, M.A.	Yew Tree Cottage, Broadstone
1927	Benny, L. B., M.A., B.SC., F.R.A.S.	Municipal College.
1921	Bevan, Trevor	17 Stirling Road
1923	Bishop, E.	21 Surrey Road
1912	Blackall, Miss E. E.	10 Harcourt Road, Boscombe Park

1908	Blackett, C. H.	68 West Cliff Road
1928	Bolitho, Mrs.	11 Portarlington Road
1910	*Bond, F. Bligh, F.R.I.B.A.	454 Gloucester Road, Bristol
1920	Borrett, Surgeon-Capt., G. G., R.N.	62 Alum Chine Road
1924	Borrett, Mrs.	,, ,,
1924	Borrett, Miss J.	,, ,,
1925	Borrow, Frederick	The Knoll, Charminster Road
1925	Borrow, Mrs.	,, ,,
1924	Bottomley, Miss O.	Langley Dene, 55 Wellington Road
1920	ABourne, Miss C. M.	56 Sunny Hill Road, West Southbourne
1927	Boyce, C.	Compton Cottage, Canford Crescent, Canford Cliffs
1927	Boyt, Miss J.	1 Ascham Road
1914	Bradbury, Miss E.	La Bocca, 2 Portarlington Road
1925	Bradley, F. L.	Holmwood, 12 Chine Crescent Road
1924	Bragg, Miss H. B.	4 Chester Road
1924	Bragg, Miss R.	,, ,,
1924	Bragg, Miss S. B.	,, ,,
1908	Brazier, J. J.	Fairlawn, 48 Lowther Road
1922	Brewitt-Taylor, Mrs. Ray	Branksome Lodge, 6 Forest Road, Branksome Park
1926	Broad, F.	Manton Villa, 2 Oxford Road
1928	Broad, Mrs.	,, ,,
1921	Bromley, Miss	81 Lansdowne Road
1917	Brown, Edward	West Ridge, Chessel Avenue
1917	Brown, Mrs.	,, ,,
1926	Brown, Lt.-Col. F. Tatton	Talbot Hurst, 3 Branksome Hill Road
1924	Brown, Miss E.	Chobham House, 4 St. Winifred's Road
1924	Brown, Miss E. S.	,, ,, ,,
1924	Brown, Miss F.	,, ,, ,,
1923	Browne, John	Serantes, Glen Road, Boscombe
1924	Browning, Miss E. M.	Littleholm, Ferndown
1905	Brumell, G., A.R.I.B.A.	Maori, 15 Richmond Park Avenue
1920	Brumell, Mrs.	,, ,, ,,
1923	Brumell, F.	,, ,, ,,
1920	Brumell, Miss M.	,, ,, ,,
1920	Bryant, Miss M.	Sunnyhill, Hampden Lane, W. Southbourne
1907	Bulfin, Ignatius, B.A.	The Den, 26 Knole Road
1908	Bulfin, Mrs.	,, ,,
1924	Burgess, J.	Kempston, Chine Crescent Road
1928	Burgess, S. H.	Southland, Barton Court Avenue, Barton-on-Sea
1928	Burgess, Mrs.	,, ,, ,,
1927	Burrell, Mrs. A. E.	Freydan Lodge, Poole Road
1924	Burroughs, F. G.	63 Maxwell Road
1919	Burstal, E., M.D.	46 Lansdowne Road
1926	Burstal, E. K., M.I.C.E.	27a Grove Road
1926	Burstal, Mrs.	,, ,,
1922	Burton, E. St. John, F.L.S., F.G.S., F.Z.S.	Melville, 4 Howard Road
1927	Burton, Stewart	Dunmere, 17 Eaton Road
1922	Bury, Henry, M.A., F.L.S., F.G.S.	The Gate House, 17 Alumdale Road

C

1928	ACalkin, J. B., M.A.	Wychwood School
1910	Cameron, Miss	Little Forest House, 19 Bath Road
1924	Campbell, Mrs.	Whingate, Broadstone
1919	Cardew, R. K., B.A.	Stafford Lodge, 26 Dean Park Road
1920	Cardew, Mrs.	,, ,, ,,

1912	Carus-Wilson, C., J.P., F.R.S. (Edin.), F.G.S.	Altmore, Waldegrave Park, Strawberry Hill, Middlesex, and Royal Societies' Club, S.W.
1927	Castell, Mrs.	62 Wellington Road
1925	Chilver, Mrs. E. K.	2 Shaftesbury Road
1912	AChilver, Miss K. M.	,, ,,
1927	Christy, R. W.	Greyfriars, Ringwood
1926	Clare, Mrs.	48 Queen's Park West Drive
1911	Clark, Walter Child	Michelgrove House, Boscombe
1927	*Clay, R. C. C., M.D., F.S.A.	The Manor House, Fovant, Wilts
1908	Coddington, E. F.	34 Irving Road
1911	Collins, W. F.	Vellore, Overcliff Drive
1928	Connah, J., B.SC., F.I.C.	Deva Cottage, Braidley Glen
1928	Constantine, M. H.	Brendon, Nairn Road
1927	Cookes, C. E.	145 Southcote Road
1912	Cooper, Ernest	100 Old Christchurch Road
1926	Cooper, H. A.	25 Talbot Avenue.
1926	Cooper, Mrs.	,, ,,
1926	Cooper, A. H.	,, ,,
1926	Cooper, Miss S. I.	,, ,,
1909	Cooper, J. Omer, M.A., F.L.S.	Armstrong College, Newcastle-upon-Tyne
1926	Cooper, J. S.	The Little Red House, Colehill, Wimborne
1908	Cooper, Rev. W. H. Windle, M.A., F.R.G.S., F.R.H.S.	Owthorpe, 21 Branksome Wood Road
1916	Cowell, G. E.	Hawthorns Hotel, West Cliff Road
1903	†oCrallan, G. E. J., M.A., M.B., M.R.C.S.	St. Cross, 13 Bodorgan Road
1922	Crallan, Mrs.	,, ,,
1920	Cressy, Miss H.	Bramcote, 1 Glen Road, Boscombe
1927	Cripps, C. Couper, M.D., M.R.C.S.	14 Dean Park Road
1927	Cripps, Mrs.	,, ,,
1922	Crowther, Miss V.	Berwyn Bank, Poulner Hill, Ringwood
1922	Curme, Miss E. M.	65 Lansdowne Road
1928	Curtis, E. A., L.D.S.	Holm Dene, Poole Road
1928	Curtis, Mrs.	,, ,,
1928	Curtis, E. J. B., L.D.S.	,, ,,
1903	oCurtis, W. Parkinson, F.E.S.	Drake North, Sandringham Road, Parkstone
1922	*Elected an Honorary member	

D

1927	Dacombe, J. M. J.	27 Holdenhurst Road
1920	Darke, Miss W. E.	25 Hawkwood Road, Boscombe
1928	ADavidson, Miss M. S., M.A., B.SC.	2 Cecil Hill
1921	ADavies, Miss H. V., B.SC.	Municipal College
1919	Davison, Miss L.	15 Dean Park Road
1924	Deas, J., M.A., I.C.S.	57 Wellington Road
1926	de Paiva, Miss E.	Sunny Halt, Hamilton Road, Boscombe
1914	Dickson, Col. W. D., J.P.	Southill, 32 Dean Park Road
1914	Dickson, Mrs.	,, ,,
1919	Dieselhorst, W., A.M.I.C.E.	50 Surrey Road
1924	Dieselhorst, Mrs.	,, ,,
1903	o*Dixon, J. R. L., M.R.C.S., L.R.C.P.	
1920	Dodd, Col. J. R., M.D., F.R.C.S.	140 Richmond Park Road
1921	Dodd, Mrs.	,, ,,
1921	Dodd, T. A.	,, ,,
1928	Dodds, H.	19 Foxholes Road, Southbourne
1910	Dodshon, E., LL.B.	126 Old Christchurch Road
1926	Dodwell, Mrs. L. B.	Crendon, Carbery Avenue, West Southbourne

1928	Drew, Lt.-Col., D.S.O.	Dudsbury House, Longham, Wimborne
1923	Druitt, Alan	Willow Lodge, Mudeford, Christchurch
1923	Druitt, Mrs.	,, ,, ,, ,,
1904	Druitt, J., J.P.	Avebury, 10 Madeira Road
1925	Druitt, Miss C. M.	,, ,, ,,
1925	Druitt, Miss C. S.	,, ,, ,,
1928	Dundee, Col. W. J.	Landi Kotal, Roseville Street, Jersey
1926	Dundee, Mrs.	,, ,, ,,
1921	Dunn-Gardner, R. C.	15 Queensbury Place, S. Kensington, S.W. 7
1924 A	Dyer, Miss G. B.	Victoria Home School, 37 Burnaby Road

E

1924	Edwards, Miss M. J.	Aysgarth, 16 Poole Road
1923	Ellen, Miss D. M.	Staunton, Exeter Park
1922	Ellis, Mrs.	10 Forest Road, Branksome Park
1922	Ellis, Miss W. M.	,, ,, ,, ,,
1923	Elrington, R.	Mavis Bank, 15 Bodorgan Road
1923	Elrington, Mrs.	,, ,,
1922	Elwes, Mrs.	Burnt Hill, Broadstone, Dorset
1924	Ensor, Mrs.	26 Frederica Road, Winton
1909	Evans, P. H. L., M.A.	Stirling House, 28 Manor Road
1927	Exon, C., M.A.	Aldermoor, Douglas Road, Southbourne

F

1920	Fairbrother, Miss L.	4 Golf Bungalows, Hindhead, Surrey
1921	Fane, F. L.	13 Littledown Road
1921	Farmar, Miss D. A.	Dorset Lodge, 10 Suffolk Road
1919	Farmar, Mrs. K. A.	Whitton Lodge, Stevenson Crescent, Parkstone
1922	Farmar, Miss E. A.	,, ,, ,, ,,
1914	Fielding, T., M.D.	Genesta, West Hill Road
1927	Finlinson, F. J.	Daneshill, Queen's Park Avenue
1927	Finlinson, Miss D. C.	,, ,, ,,
1903 OA	Firbank, Miss, LL.A., A.C.P.	5 Buchanan Avenue
1928	Fitzgerald, Miss L. F.	42 Herberton Road
1922	Fonblanque, Miss Ida	4 Gordon Road
1928	Formoy, J. A., F.R.A.S., F.C.S.	2 Richmond Gardens
1917	Forrest, Mrs.	The Cottage, Benellen Towers, Branksome Wood Road
1927	Foster, W. J., F.R.C.S.	53 Browning Avenue, Boscombe
1927	Foster, Mrs.	,, ,,
1925	Fountain, E. D., L.R.C.P., M.R.C.S.	Vron, 30 Mansfield Road, Parkstone
1925	Fountain, Mrs.	,, ,, ,, ,,
1922	Fowler, A. R. W., B.A.	St. Ina, Beechwood Avenue
1922	Fowler, Mrs.	,, ,, ,,
1919	Fowler, Miss M.	Lerryn, Chessel Avenue
1925	Fowler, Miss R.	,, ,,
1924	Freer, Miss L. W.	1 Branksome Park Avenue
1927	French, F. W.	1 Ascham Road
1927	French, Miss J. E.	,, ,,
1909	French, J. M.	Jumpers House, Christchurch
1923	Fryer, Miss C. H.	Moulton, 46 Wellington Road
1928	Fryer, Miss G. M.	4 Milton Road
1928	Fulcher, L. W., B.SC.	60 Herberton Road
1928	Fulcher, Mrs.	,, ,,

G

1922	Gardiner, Miss F. M.	3 Adeline Road, Boscombe
1926	Gardiner, H. L.	,, ,,
1922	Gatty, Lady K.	Ossemsley Manor, Christchurch
1922	Gatty, Miss H.	,, ,,
1922	Gatty, Oliver	,, ,,
1922	Gatty, Richard	,, ,,
1924	George, Miss M.	3 Balmoral, West Hill Road
1923	Gibbs, F. L. A.	Hawthorns Hotel, West Cliff Road
1921	Gibbs, G. F.	Fairview, 13 Herbert Road
1914	Gill, Edwin R., A.R.C.A.	Rosslyn, Seldown, Poole
1925	Gill, Miss Ida	,, ,, ,,
1922	Gill, Major W. R.	Chewton Lodge, Highcliffe
1923	Gill, Mrs.	,, ,, ,,
1924	Goddard, Rev. C. V.	62 Parkwood Road, Boscombe
1925	Goodacre, Rev. C. B.	3 Cecil Road, Boscombe
1924	Goode, Mrs.	50 Surrey Road
1927	Gorton, B., M.R.C.V.S., M.P.S.	22 Arnewood Road
1921	Gosse, W., M.D., D.P.H.	Langley, Rowlands, Wimborne
1904	Gray, Arthur	Woodville, 26 Melville Road, Winton
1911	Gray, Mrs.	Darena, 15 Wellington Road
1921	Greg, Mrs.	Fuji Yama, 9 Hengist Road
1914	Greves, E. Hyla, M.D., F.R.C.P.	Rodney House, 19 Poole Road
1914	Greves, S. S. Hyla	,, ,,
1917	Grindley, Miss E. J.	Milnthorpe, Rossmore Avenue, Parkstone

H

1923	Haigh, A. E.	Exhall, 20 Christchurch Road
1924	Hall, L. Beeching, F.L.S.	Lingdene, King's Avenue, Parkstone
1921	Hardwick, S.	51 Poole Hill
1913	Harris, Miss K.	Trescott Grange, Harvey Road, Boscombe
1912	Harrison, Henry	Eden Lodge, 7 Surrey Road South
1927	Harrison, Miss J. D.	13 Beresford Road
1926	Harrison, Miss M. P.	Hinton Vicarage, Christchurch
1914	Hartley, Dr. J.	62 Portchester Road
1914	Hartley, Mrs.	,, ,,
1922	Hartley, J. A.	,, ,,
1927	Hartree, D. G.	197 Holdenhurst Road
1927	Hartree, Miss B. M.	,, ,,
1914	Hatton, Rev. C. O. S., B.A., F.L.S.	Hinton Vicarage, Christchurch
1921	*Elected an Honorary Member	
1920	Hawes, Miss	The Moorings, 27 Nelson Road
1924	Hawley, Miss H. M.	Galloway Lodge, 27 Florence Road, Boscombe
1917	Haydon, C. J.	Ben Veula, 29 West Cliff Road
1923	Hayman, Mrs.	Thorncliffe, Queen's Park South Drive
1918	Haythorne, E. C. C.	Forest Lodge, Burton Road, Branksome Park
1921	Hellyar, Miss E. F.	Cerne Abbas, 1 Belvedere Road
1921	Hellyar, Miss M. F.	,, ,,
1923	Hellyar, Miss M. R.	,, ,,
1928	Henderson, Major H. E.	Tall Trees, Wayside Road, Southbourne
1928	Henderson, F. W., L.R.C.S.I., L.K.Q.C.P.I.	4 The Tankerville, Owls Road, Boscombe
1917	Henderson, Miss A. J.	Springbank, 22 Fox Road, Greenock
1921	Heymann, B. M.	Greencroft, Alyth Road, Talbot Woods
1921	Heymann, Mrs.	,, ,, ,,

1923	Hill, C. S.	Northfield, Chigwell Road
1928	Hill, Miss E. C.	The Homestead, 29 St. John's Road, Boscombe
1904	**Hinton, Miss**	Welcombe, Wilfred Road, Boscombe
1924	Hoare, Miss E.	7 Cambridge Road
1928	Hobbs, Mrs. J. A.	Chingri Khal, Queen's Park Avenue
1928	Hobbs, Miss D. M.	,, ,, ,,
1922	Holdom, Mrs. E.	Cranfield, Mansfield Road, Parkstone
1909	Holmes, Mrs.	Brackenwood, 37 Southern Road, West Southbourne
1911	Holmes, Miss S. C. M.	3 New Park Road
1911	Homer, L. V. C.	Carron, 54 Southcote Road
1928	Hookey, Miss B.	Clinton, R. L. Stevenson Avenue
1920	Horne, Miss J.	Ayton House, West Cliff Road
1924	Howell, W. Rees	Cintra, 35a Richmond Wood Road
1923	Howell, Mrs. Rees	,, ,, ,,
1911	Hudson, F.	Penarol, Parkstone
1911	Hudson, Mrs.	,, ,,
1925	Humby, H. G.	Brackendene, 23 Wimborne Road
1925	Humby, Mrs.	,, ,,
1927	Hunt, Mrs. F.	33 Stirling Road
1926	Hurry, J. B., M.A., M.D., J.P.	Hinton Firs, 15 Gervis Road
1926	Hurry, Mrs. G. L.	,, ,, ,,
1926	Hurry, A. G, M.A.	,, ,, ,,
1927	Hutchinson, Mrs.	Windermere, Canford Cliffs

I

1905	Ibbett, F. W., M.A.	Town Hall
1920	*Elected an Honorary Member	
1927	Ingram, Miss S. I. C.	Caldicott, Anthony's Avenue, Parkstone
1926	Innes, A. A.	Old Pines, Ferndown
1925	Insch, J. M.	18 Beechwood Avenue
1925	Insch, Mrs.	,, ,,

J

1921	Jackson, Mrs. Gidlow	64 Portchester Road
1926	Jackson, Mrs. C. M.	The Dakota, Beaulieu Road, Alum Chine
1912	James, T. B.	Trevenen, Howard Road
1912	James, Mrs.	,, ,,
1920	James, S.	,, ,,
1928	James, W. B., B.SC.	687a Christchurch Road, Boscombe
1927	Jameson, W. G.	43 Wentworth Avenue, W. Southbourne
1923	Jenkins, Miss B. M.	7 Talbot Avenue
1925	Jones, Miss A. R.	Abbotsfield, 1 Leicester Road, Branksome Park
1922	Jones, J. Williamson	Tyndal Lodge, Forest Road, Branksome Park
1908	A Jones, W.	3 Granville Road, Boscombe
1905	Jones, W.	254 Old Christchurch Road
1928	Jordan, Mrs. E. M.	Kirkburn, 9 Dunkeld Road
1928	Jordan, Miss E.	,, ,,
1927	Jourdain, Rev. F. C. R., M.A., M.B.O.U.	Laverstock, 13 Belle Vue Road, Southbourne

K

1910	Kay, A. J.	Valliscourt, 100 Lowther Road
1923	Kenrick, Miss M.	8 St. Luke's Road

1927	Kilburn, Miss Alice M.	9 Glenmoor Road, Winton
1927	Kilburn, Miss Annie	,, ,,
1928	King, F. G.	66 St. Alban's Avenue

L

1919	Lacey, Howard, B.A.	50 Wellington Road
1928	Lane, F. E.	41 St. Alban's Avenue
1926	Laughlin, Col. Charles	Carbery Wood, Tuckton Road, Southbourne
1923	Lawrence, Mrs.	66 Portchester Road
1919	Leech, Miss M. M.	Castle Bar, 32 Crabton Close Road, Boscombe
1910	Lendrum, Miss A. M.	13 Carysfort Road
1925	Little, J. T., M.A.	Yed Hill, Ringwood
1925	Little, Mrs.	,, ,,
1925	Little, Miss C. J.	,, ,,
1925	Little, Miss S. P., M.A.	,, ,,
1922	Littleboy, Miss E. S.	2 Bodorgan Manor, 12 Bodorgan Road
1923	Littlewood, Engineer Capt. A. W., R.N., retd., O.B.E., Chevalier Legion of Honour	28 Princess Road
1922	Logan, T. T.	10 Argyll Road, Boscombe
1916	Logan, Mrs.	,, ,,
1922	Logan, Miss G. M.	,, ,,
1922	Logan, Miss S. M.	,, ,,
1924	Longbottom, F. W., F.R.A.S.	Haslemere, Penrith Road, Boscombe
1928	Longbottom, Mrs.	,, ,, ,,
1920	ALove, W. J. E.	St. Clement's School House
1903	oLupton, Miss	Bolingbroke, Knole Road
1909	Lyon, Claude	Shalimar, Wilderton Road, Branksome Park
1910	Lyon, Mrs.	,, ,, ,,

M

1908	AMackay, Miss	8 King's Park Road
1911	McBean, Miss J.	Inglenook, 29 Parkwood Road
1909	McBean, Miss S.	St. Michael's, Buxton
1920	Male, H. C., M.D., M.R.C.S.	35 Irving Road, West Southbourne
1925	Male, Miss G. E.	,, ,, ,,
1917	Marston, Miss G.	Bourne Hall Hotel
1913	Martin, Miss F. G.	32 Southbourne Road
1914	Mate, S. J.	10 Landseer Road
1921	Mate, Mrs.	,, ,,
1918	Matthews, Mrs. J. P.	The Bungalow, Lascelles Road, Boscombe
1921	Mattocks, Mrs.	Meyrick Cliffs Hotel, Beacon Road
1925	Mattocks, C. G. B.	,, ,, ,,
1922	Mattocks, T. E. T.	,, ,, ,,
1928	Maunder, A. V., B.A.	Hinton Firs, 15 Gervis Road
1926	Mears, Miss J. A.	27 St. Alban's Crescent
1926	Miles, Mrs. F. A.	Milestone, 16 Meyrick Park Crescent
1925	Miller, Miss B.	Sunnycroft, 15 Penrith Road, Boscombe
1926	Miller, Miss W. F., B.A.	,, ,, ,,
1927	Mitchell, Miss F. H.	Moor House, Ferndown
1922	Moore, Major T. C., I.M.S.	Verwood, Dorset
1919	Moorhead, Mrs.	Brightlands, 34 Crabton Close Road
1908	†*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.SC., D.C.L., LL.D., F.L.S.	14 Crabton Close Road
1911	Morris, Lady	,, ,,

1926	Morton, Hamilton, M.A., M.D.	Court Lodge, Tower Road, Branksome Park
1908	Moss, Miss	The Grange, 52 Westby Road
1924	Moulson, Miss R.	20 St. Stephen's Road
1925	Murray, C. H.	Hallowdene, Belle Vue Road, Parkstone

N

1919	Nankivell, B. W., M.R.C.S., L.R.C.P.	Woodstock, 2 West Cliff Road
1928	Nathan, N. J.	20 Court Road
1928	Nathan, Mrs.	,, ,,
1912	Neave, Miss	Lingdale, 73 Lansdowne Road
1927	Newcome, Mrs. R. F.	25 Queen's Park South Drive
1925	Newman, Mrs. C. A.	Harewood, 17 Dean Park Road
1928	ᴀNicholls, Miss A. G.	Sainte Marie, Ashton Road, Redhill Park
1926	Nicholson, A. J.	Maryland, Leicester Road, Branksome Park
1928	Norris, Mrs. M. E.	27 Albemarle Road

O

1920	Oaten, Mrs.	19 Sunnyhill Road, W. Southbourne
1922	ᴀOdell, Miss M. E., B.SC.	44 Compayne Gardens, London, N.W. 6
1910	Oke, A. W., B.A., LL.M., F.G.S., F.S.A.	32 Denmark Villas, Hove, Brighton
1927	Oldham, H.	Holmesdale, Browning Avenue
1924	Ormrod, T. B.	The Little White House, Penrith Road
1920	Osborne, J. H.	Woodside, Kinson
1922	Ousby-Trew, Rev. C., M.A.	Overthorpe, 19 Florence Road, Boscombe
1922	Ousby-Trew, Mrs.	,, ,, ,, ,,
1922	Ousby-Trew, Miss	,, ,, ,, ,,

P

1904	Painter, Mrs.	29 Talbot Road
1919	Parker, Miss M.	The Cliff, 13 Southwood Avenue, W. Southbourne
1926	Parrott, F. W.	33 Heathwood Road
1928	Parry, Miss A. K.	Tilneyhirne, St. John's Road, Boscombe
1926	Parton, Miss E. C.	197 Holdenhurst Road
1926	Parton, Miss M. A.	,, ,,
1927	Paterson, Mrs. E. B.	The Grove, Grove Road
1926	Paterson, Miss L.	Corfe Lodge, Parkstone
1926	Paterson, Miss M.	,, ,,
1926	Paterson, Miss N.	,, ,,
1924	Pattinson, Dr. T. W.	59 Wellington Road
1924	Pattinson, Mrs.	,, ,,
1925	Peach, Miss M. E.	12 Bryanston Road
1924	Pells, J.	9 Stokewood Road
1913	†Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.	Woodbury, 9 Grove Road, East Cliff
1916	Penrose, Mrs.	,, ,, ,,
1916	Penrose, Miss F.	,, ,, ,,
1916	Penrose, Miss M., B.SC.	,, ,, ,,
1912	Pestell, Miss	Engelberg, 92 Surrey Road
1911	Phillips, Mrs.	Allendale, New Milton

1921	Phillips, Rev. C. A.	36 Dean Park Road
1921	Phillips, Miss C. E.	,, ,, ,,
1928	Phillips, Rev. F. B.	Charlton Marshall, Blandford
1928	Phillips, Mrs.	,, ,,
1920	Pilkington, Mrs. K. C. S.	The Steyne, 9 Manor Road
1920	Pilkington, Miss K. D.	,, ,,
1920	Pilkington, Miss L. D.	,, ,,
1927	A Pocock, Miss E.	67 Wentworth Avenue
1927	Pollen, G. A. J.	San Remo, Durley Road
1921	Pontifex, R. D.	Dalton House, 68 Christchurch Road
1920	Pontifex, Mrs.	,, ,, ,,
1921	Pontifex, G. K. D.	,, ,, ,,
1926	Potter, Rev. Prof. M. C., M.A., D.SC., F.L.S.	Corley Croft, York Avenue, New Milton
1926	Power, Lady	Newlands Manor, Lymington
1925	Price, L.	Oakwood, Harvey Road, Boscombe
1925	Price, Mrs.	,, ,, ,,
1925	Price, Miss H. B. K.	,, ,, ,,
1918	Punch, Cyril	60 Wellington Road

Q

1922	Quick, R., F.S.A. (Scot.)	Russell-Cotes Art Gallery and Museum
1924	Quick, Mrs.	,, ,, ,, ,,

R

1927	Raine, A. D.	Milverton, Lymington
1927	Raine, Mrs.	,, ,,
1928	Randolph, Miss K.	Restawhile, Whitecliff Road, Parkstone
1912	Rankin, W. Munn, M.SC. (Leeds), B.SC. (Lond.)	Municipal College, Burnley, Lancs.
1920	*Elected an Honorary Member	
1917	Ranshaw, Miss E. M.	9 Warren Road
1918	Ratcliffe, Mrs.	Brooklands, 32 Branksome Wood Road
1926	Rayner, Miss E.	The Homestead, 29 St. John's Road, Boscombe
1919	Rayner, Miss F.	,, ,, ,,
1905	*Rayner, J. F., F.R.H.S., M.B. MYC. S.	Swaythling, Southampton
1922	Rebbeck, Lt. L. E., R.N.	Stafford Lodge, 26 Dean Park Road
1927	Rees, Commandant S. J., J.P.	Linden Hall Hydro, Boscombe
1928	Rees, Miss C. St. B. M.	Invermay, Manor Road, Swanage
1923	Reeves, Miss S., M.B.E.	St. Cross, 13 Bodorgan Road
1924	*Reid, Mrs. E. M., B.SC., F.L.S.	Pinewood, Milford-on-Sea
1928	Reid, Mrs. F. K.	Westminster Hall Hotel, West Cliff
1928	Reid, Miss F. A.	,, ,, ,,
1928	Richards, Mrs. E. M.	17 Dunbar Road
1919	Richards, Miss E. E., B.SC.	West Cliff Towers, 12 Priory Road
1927	Richey, H. A., B.A.	1 Brookside, Exeter Lane
1927	Richey, Mrs.	,, ,,
1926	Rix, Miss M. E. de B.	Wayside, Stourcliffe Avenue
1916	Roberts, H. Astley, B.A.	Shalvah, Wilfred Road, Boscombe
1918	Roberts, Mrs.	,, ,, ,,
1924	Roberts, Mrs. J.	Aysgarth, 16 Poole Road
1924	Roberts, Mrs. W. F. M.	19 Florence Road, Boscombe
1924	Robertson, W. G. A., M.D., D.SC., F.R.C.P., F.R.S.(Edin.), F.S.A.(Scot.)	St. Margaret's, Keswick Road, Boscombe

1927	Robins, F. W., F.R.G.S.	4 Harewood Avenue, West Southbourne
1928	Robson, Alderman H., J.P.	Mulgrave, Meyrick Park Crescent
1923	Roden, Miss E. M.	14 Campbell Road, Boscombe
1905	Rogers-Barns, Miss	Vergers Mead, Corfe Castle
1914	**Rooke,** Miss S. G.	Norbury, 53 Paisley Road
1914	*Roper, Miss Ida M., F.L.S.	4 Woodfield Road, Redland, Bristol
1922	Rosling, A. W.	12 East Avenue
1922	Rosling, Mrs.	,, ,,
1922	Rosling, Miss D. M.	,, ,,
1916	Rothwell, Mrs.	21 Wentworth Avenue, West Southbourne
1925	Ruddle, Mrs. F. J.	12 Richmond Park Crescent
1913	Russell-Cotes, H. V. M.	8 Meyrick Park Crescent

S

1926	Sale, G.	Fixby, Milner Road
1926	Sale, Miss L.	,, ,,
1926	Sale, Miss M.	,, ,,
1926	Sale, V. M.	,, ,,
1925	Saunders, E. W.	Deep Dale, 41 Surrey Road
1925	Saunders, Mrs.	,, ,,
1928	Saunders, E. C.	,, ,,
1928	Saunders, Miss U. G.	,, ,,
1919	Savage, J. W.	41 Wentworth Avenue, W. Southbourne
1927	Sayle, G. M.	Malvernbury, Watcombe Road
1912	Scarlett, Miss A.	Fermoy, 4 St. Alban's Avenue
1915	Scholes, Mrs.	Aldourie, Branksome Wood Road
1922	Scholes, R. D.	,, ,,
1922	Scholes, Miss V. O. M. D.	,, ,,
1926	Scollick, Mrs.	Brundon, 2 Surrey Road
1919	Scott, G. B., C.I.E.	Glencoy, 80 Surrey Road
1904	Scott, J. H., M.E., M.I.M.C.E.	Kirkby, 22 Linwood Road
1916	ASeeviour, G. C., A.C.P., F.R.H.S.	St. Peter's School House
1926	Seymour, Mrs. A. J.	Georgian Hotel, Priory Road
1926	Shann, W. A., M.B.	31 Hamilton Road, Boscombe
1914	Sharp, C.	Langdon, Parkstone
1919	Sharp, Miss E.	,, ,,
1919	Sharp, Miss F.	,, ,,
1928	Sharp, Miss A. M.	23 Churchill Road
1927	Sherrard, Miss L. J.	Royal Bath Hotel
1923	Sherrin, T. M., M.A.	5 Landseer Road
1903	**G** oSherring, R. Vowell, F.L.S.	Hallatrow, near Bristol
1907	Sherring, Miss O. L.	,, ,,
1928	Shipley, Mrs. R. H.	2 Wimborne Road
1926	Shipman, Lt.-Col. H. J.	28 Surrey Road
1916	Simpson, Rev. E. J. Douglas, M.A.	Maesbury, 3 Cavendish Road
1920	Simpson, N. Douglas, B.A., F.R.M.S., F.L.S.	,, ,,
1927	Sitwell, H. W. W.	Glenconnor, Ferndown
1927	Sitwell, Miss M. R.	,, ,,
1925	Smith, H. H.	9 Cambridge Road
1926	Smith, Mrs.	,, ,,
1918	Smith, Horace, M.A., M.D.	Sunnyhurst, 7 Dean Park Road
1918	Smith, Miss M. A.	Woodside, St. Alban's Crescent
1914	Smyth, W. Johnson, M.D.	Pirbright, West Cliff Gardens
1922	Smyth, Mrs.	,, ,,
1922	Smyth, Miss M.	,, ,,
1912	Smythe, J. H. Ralph, J.P.	Willstead, 22 Cavendish Road
1915	Smythe, Mrs.	,, ,,

1920	Smythe, Miss D.	Willstead, 22 Cavendish Road
1916	Smythe, Miss K. M.	,, ,,
1919	Snell, Dr. S. H., M.B.O.U.	1 Portman Crescent
1919	Snell, Mrs.	,, ,,
1919	Snell, Miss M.	,, ,,
1924	Snell, Miss W.	,, ,,
1921	Sowton, Miss E. M.	57 Southbourne Road, W. Southbourne
1922	Speakman, Mrs. E.	13 Milton Road
1909	Spencer, J. F.	Glenthorne, 73 Richmond Park Road
1917	ASpry, Miss A. G., LL.A.	12 Sunnyhill Road, W. Southbourne
1923	Stables, A. D.	Saxthorpe, St. Osmund's Road, Parkstone
1923	Stables, Mrs.	,, ,, ,, ,,
1926	Standring, J.	Naseby Nye, Byron Road, Boscombe
1926	Standring, Mrs.	,, ,, ,,
1923	Starr, Col. W. H., C.B., C.M.G., C.B.E.	Nikko, Foxholes Road, Southbourne
1921	Stevens, C. S.	Goodwin, Howard Road
1916	Stiff, S. J., B.SC.	Norden House, Corfe Castle
1916	Stiff, Mrs.	,, ,,
1916	Stiff, Miss M. J.	,, ,,
1928	Stiff, Miss F. M.	Chester House, Chine Crescent
1928	Stone, Miss E. J.	7 Strouden Avenue
1920	Stoney, Miss F. A., O.B.E., M.D., B.S.	12 Burnaby Road
1924	Story, F. N.	Storyland, Church Road, Southbourne
1924	Story, Mrs.	,, ,, ,, ,,
1925	Strachan, Lt.-Col. E. A.	Moorfield, 1 Bodorgan Road
1918	G†*Sumner, Heywood, F.S.A.	Cuckoo Hill, South Gorley, Fordingbridge
1928	Sutherland, W.	Silverdale, 20 Penn Hill Avenue, Parkstone
1928	Sutherland, Mrs.	,, ,, ,,
1926	Sutton, W. R.	Bodowen, Strouden Road East
1926	Sutton, Mrs.	,, ,, ,,
1906	Swallow, E.	York Cottage, Ravine Road, Canford Cliffs
1922	ASymes, H., M.A.	52 Lowther Road

T

1927	Tanner, Mrs. Slingsby	2 Cavendish Place
1911	Tatchell, Leonard, F.E.S.	Swanage, Dorset
1915	Taylor, F. B., B.A.	Claregarth, Montague Road, W. Southbourne
1916	Taylor, Mrs.	,, ,, ,, ,,
1916	Taylor, Miss M. A.	,, ,, ,, ,,
1916	Taylor, Miss M. W.	,, ,, ,, ,,
1928	Taylor, Mrs. R. A.	17 Dunbar Road
1928	AThackeray, Miss E., B.A.	4 Pine Tree Glen
1923	Thill, J. A.	8 Colville Road, Boscombe
1923	Thill, Mrs.	,, ,,
1925	AThomasson, Miss M. E.	37 Belvedere Road
1927	Thompson, E. H.	Ardmore, Langdon Road, Parkstone
1922	Thomson, A. W. Ferguson	Ailsa, Erpingham Road
1928	Thomson, Mrs.	,, ,,
1911	Thomson, Mrs. Roberts	Monkchester, 17 Manor Road
1928	Thornton, Mrs. Sykes	Moorland Court, Queen's Park West Drive
1919	Thoroton, Rev. L. E. W.	Hill House, Spencer Road, Canford Cliffs
1911	Tickell, Miss S. M.	Capri, 90 Richmond Park Avenue
1911	Turner, J. E.	Bramley, 94 Surrey Road
1914	Twemlow, Miss E. E.	Devon Lodge, 83 Alumhurst Road

V

1913	Veale, Miss A. G.	151 Richmond Park Road
1923	Veale, Miss B.	2 Richmond Park Crescent
1923	Veale, Miss C. M.	,, ,,
1923	Veale, Miss L. H.	26 Heatherlea Road, Southbourne
1908	Vernon, Lieut.-Col., A. H., L.R.C.P., F.R.C.S.	1 Carnarvon Crescent, Boscombe
1918	AVorse, John	Leighurst, Walkford, Christchurch

W

1903	**G**o†Waddington, H. J.	Moreton, 107 Lowther Road
1918	*Elected an Honorary Member	
1924	AWadlow, H. J.	The Gables, Queen's Grove, Parkstone
1916	Walby, A. E.	Netherton, 2 Dean Park Road
1921	Wales, Miss	The Nook, 4 Ormonde Road, Branksome Park
1921	Wales, Miss N.	,, ,, ,, ,,
1928	Walker, Miss G. M.	Meyrick Cliffs Hotel
1918	Walker, R. S.	,, ,,
1913	Wallace, W. G.	Doveshill Cottage, Ensbury Park
1912	Walter, Mrs. G. P.	Rusholme, 10 St. Anthony's Road
1923	Walter, T. James	19 Dunkeld Road
1920	Wanstall, W. S.	Del Monte, 6 Roslin Road
1920	Wanstall, Mrs.	,, ,,
1927	Ward, H. P.	Braemar, Egerton Road
1927	Ward, Mrs.	,, ,,
1905	Waters, A. W., F.L.S., F.G.S.	Alderley, 2 McKinley Road
1906	Waters, Mrs.	,, ,,
1928	Watson, Miss E. M.	20 Southwood Avenue
1928	Webber, Miss M. A.	Stoke, Stokewood Road
1928	Welfitt-Nicholls, Miss A.	48 Drummond Road
1928	Welfitt-Nicholls, Miss C.	,, ,,
1928	Welfitt-Nicholls, Miss E.	,, ,,
1920	Wells, Rev. E., M.A.	Glen Roy, 22 Studland Road
1924	West, Miss M. G.	Larnaca, 23 Argyll Road, Boscombe
1913	Wetherell, Miss M.	Triana, 21 Harvey Road, Boscombe
1920	Wetherell, Miss S.	,, ,, ,, ,,
1918	Whitaker, S.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., M.S.A.	22 Selwood Road, Addiscombe, Croydon
1924	Whitaker, Miss E. M.	The Lawn School, Clevedon
1920	White, J. R. M.A.	Whitecot, 15 Linwood Road
1920	White, Mrs.	,, ,,
1921	White, Mrs. E. Sinclair	35 East Avenue
1916	Whyte, A. C.	Byberry, 5 Roslin Road
1916	Whyte, Mrs.	,, ,,
1916	Whyte, Miss M. C.	,, ,,
1916	Whyte, Miss M. N.	,, ,,
1927	Wigmore, A. J., B.A., M.R.C.S., L.R.C.P.	Aymestrey, Tuckton Road, Southbourne
1927	Wigmore, Mrs.	,, ,, ,,
1927	Wigmore, Miss	,, ,, ,,
1919	Williams, John	Brynmill, 68 Southcote Road
1926	Williamson, H. J.	Quiddington, Birchwood Road, Parkstone
1924	AWillis, Miss G. H.	116 Paisley Road, West Southbourne
1920	Woodhouse, Rev. A. P.	Deanhurst, 5 Littledown Road
1905	Woodhouse, W. J., A.C.P., M.I.H.	35 Chatsworth Road, Malmesbury Park
1918	Woodhouse, Mrs.	,, ,, ,, ,,

1923	Woodhouse, W. R.	35 Chatsworth Road, Malmesbury Park
1923	Woodhouse, Miss M. M.	,, ,, ,, ,,
1928	Wright, J.	Ranmoor, Motcombe Road, Branksome Park

Y

1924	Yates, Rev. A. G., M.A., R.N.	14 Wellington Road
1924	Yates, Mrs.	,, ,,
1924	Yates, Miss E. M. M.	,, ,,
1917	A Young, Miss A.	6 Salisbury Road, Boscombe
1928	Young, Mrs. E.	Dunelm, Brackendale Road

RULES OF THE
Bournemouth Natural Science Society.

(*As amended, October* 1928.)

Title

1.—The title of the Society shall be THE BOURNEMOUTH NATURAL SCIENCE SOCIETY.

Objects

2.—The objects of the Society shall be:

(*a*) The promotion of the study of Science in all its branches, by means of Lectures, Field Meetings, the Reading and Discussion of Papers, the formation of Sections of its members devoted to any particular branch of the Society's work, and in any way that the Council of the Society shall deem advisable.

(*b*) The making of reports on any animal, plant, or object of interest, and the carrying out of the recommendations contained in such reports.

Members

3.—The Society shall consist of Ordinary, Life, Honorary and Associate Members.

Ordinary Members

4.—Ordinary Members shall pay an Annual Subscription of One Pound, due on the first day of October in each Year. The inclusive Annual Subscription for Adult Members of the same family, not exceeding four and residing in the same house, shall be Two Pounds, each Member being elected in the usual manner and each receiving a card of membership. Persons living outside a radius of six miles from the Square at Bournemouth may be elected Country Members, and pay one half the above rates of subscription.

Life Members

5.—The Subscription for Life Members shall be Ten Pounds. Any Ordinary Member who shall have commuted his Subscription, as provided for in this Rule, shall become a Life Member, but shall not by reason thereof have any rights differing from those of an Ordinary Member.

¶ Rules 5a and 5b referred to in the Trust Deed are Rules 19 and 20.

Honorary Members

6.—Any person distinguished in Science or who has rendered any special service to the Society, may be elected an Honorary Member. Honorary Members shall be proposed and elected in the same way as Ordinary Members. The number of Honorary Members shall be limited to twenty.

Associate Members

7.—Persons may be admitted Associate Members by the Council on account of their scientific attainments or because they are likely to prove useful working Members of the Society. This privilege will usually be granted to School Teachers.

The annual subscription for Associate Members shall be seven shillings and sixpence. They shall be entitled to all the privileges of Membership except that they shall have no power of voting on the affairs of the Society or of holding office.

Proposal and Election of Members

8.—The Ordinary, Life, and Associate Members of the Society shall be proposed by a Member to whom they are known personally or to whom they have presented adequate credentials, and seconded by another Member, and the proposal, in the form following these Rules, shall be sent to the Honorary Secretary. The name of any such proposed new Member shall be posted on the Notice Board of the Society for a period of not less than seven days, after which such name shall be voted upon at the next ensuing Council Meeting, and if two-thirds of the Council present and voting shall vote for the proposed New Member, such Candidate shall become a Member upon payment of the Annual Subscription and shall receive a Card of Membership which is not transferable. Any Member joining during August or September shall receive a Card of Membership to September 30th of the following year without further payment.

Unpaid Subscriptions

9.—Any Members whose subscriptions are unpaid at the end of the financial year (September 30th), after notice in writing to that effect has been given to them by the Honorary Treasurer, shall be reported to the Council, which shall have the power of removing their names from the list of members.

Resignations.

10.—Resignations must be in writing and addressed to the Honorary Secretary. Members are liable for all subscriptions which may have fallen due prior to the date of resignation.

Executive Officers.

11.—The Executive Officers of the Society shall be the Chairman of Council, the Deputy Chairman of Council, Honorary Treasurer, and Honorary Secretary.

The President

12.—The President shall be elected annually and need not necessarily be selected from Members of the Society. He shall be invited to deliver an Address at as early a date in the Winter Session as can be arranged.

Vice-Presidents

13.—Any Member of the Society who, in the opinion of the Council, has rendered distinguished service to Science or to the Society, shall be eligible for election as a Vice-President at the Annual Meeting and, if elected, shall retain office as long as he remains a Member of the Society.

Chairman of General Meetings

14.—The President or a Vice-President shall take the Chair at all General Meetings other than the Annual and Special Meetings. At these the Chairman of Council or Deputy Chairman shall preside.

Honorary Secretary

15.—The Honorary Secretary shall perform all the usual secretarial work, shall keep minutes of all Council Meetings, and of the Annual and Special Meetings, and make a synopsis of all other General Meetings. He shall cause the agenda of the Annual and Special Meetings to be sent to every Member seven days at least before each such Meeting. He shall make all preparations for General Meetings and General Excursions, in respect of which he shall collect from each Member his share of the expenses, and therefrom defray all costs of the Meetings or Excursions.* Any surplus of such collections shall go to the General Fund, and any deficit be defrayed out of that Fund. He shall keep an account of all out-of-pocket expenses. He shall give notice of their election to all new members, and register the Sections, if any, to which they ask to belong. He shall furnish copies of the Annual Reports published during their membership, to all Members who have paid their subscriptions, the number of copies of the "Proceedings" supplied in respect of each family subscription shall not exceed two; to Honorary Members, and to such Scientific Societies as the Council may from time to time appoint to receive them.

*Note.—Tickets may be returned and the money refunded up to the expiration of the time for taking tickets for any Excursion; after that date, no money can be refunded even if the tickets are not used.

Honorary Treasurer

16.—The Honorary Treasurer shall have the custody of the General Funds of the Society. He shall receive and acknowledge all Subscriptions, and shall issue tickets of Membership to all persons who are duly elected and have paid their Subscriptions. He shall bring before the Council any accounts that are due for payment. He shall prepare a financial Statement at the end of each Financial Year to be presented to the Council at the Meeting next preceding the Annual Meeting. After presentation of the Financial Statement to the Council, he shall submit it to the Auditors and lastly to the Annual Meeting of the Society.

Council

17.—There shall be a Council of the Society consisting of the Vice-Presidents who have filled the office of President, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, the Chairmen of Sections, not more than ten Members elected by the Society and not more than two co-opted Members.

18 (*a*).—The Council shall have the general management of the Society and the control of its funds. At all Meetings of the Council, five shall form a quorum. The Council shall elect its own Chairman and Deputy Chairman for the Year, shall have power to fill up vacancies in its number, and to co-opt not more than two additional members. The Council shall have power to appoint Committees to deal with any business that may be delegated to them.

(*b*) The Chairman, or in his absence the Deputy Chairman, shall have an original and a casting vote at all Meetings of the Council.

(*c*) The Council shall arrange all Lectures, Papers, Demonstrations and Exhibitions of Specimens, etc., for the General Meetings and Excursions of the Society, and shall approve of all arrangements for Sectional Meetings and Excursions before they are included in the monthly programme.

(*d*) If any elected or co-opted member of the Council shall fail to attend four consecutive Meetings of the Council, his seat shall become vacant unless the Council shall decide otherwise.

Trustees

19.—The property of the Society shall be vested in Trustees who shall be elected by the Council. The number of Trustees shall be not more than nine or less than three, and they shall respectively hold office until death or resignation, unless removed from office by a resolution of the Council. The Trustees shall from time to time deal with the property of the Society as directed by resolution of the Council (of which an entry in the minute book shall be conclusive evidence), and they shall be indemnified against all liability whatsoever out of the property for the time being of the Society.

¶ This Rule is referred to in the Trust Deed as Rule 5a.

Borrowing Power

20.—If at any time the Society in general meeting shall pass a resolution authorising the Council to borrow money, the Council shall thereupon be empowered to borrow for the purposes of the Society such amount of money, either at one time or from time to time, and at such rate of interest, and in such form and manner, and upon such security as shall be specified in such resolution, and thereupon the Trustees shall make all such dispositions of the property of the Society or any part thereof, and enter into such agreements or arrangements in relation thereto, as the Council may by resolution direct for giving security for such loan or loans and interest thereon at the agreed rate. All members of the Society, whether voting on such resolution or not, and all persons becoming members of the Society after the passing of such resolution shall be deemed to have assented to the same as if they had voted in favour of such resolution.

¶ This Rule is referred to in the Trust Deed as Rule 5b.

Visitors

21 (*a*).—A Member may introduce friends who accompany him to all parts of the Society's premises except those which are let or in use for a Lecture or Meeting. The Member must enter the names and addresses of such Visitors in the Visitors' Book and sign the entry. Strangers cannot be admitted on presenting a Member's card or letter.

(*b*) A Member may introduce two Non-Members, who accompany him, to any Lecture or Excursion of the Society, but no Non-Member may be thus introduced to more than two Lectures in the Winter Session and two Excursions in the Summer Session, even though introduced by different Members. In the case of Lectures, the introducing Member must enter the names and addresses of the Visitors in the Visitors' Book and sign the entry. In the case of Excursions, the introducing Member must send the names and addresses to the Organiser of the Excursion.

(*c*) A Member introducing a Visitor is responsible for ascertaining that the Visitor has not been introduced twice previously in that Session and also that the privilege is not used for commercial purposes.

(*d*) A Visitor to Bournemouth may, with the approval of the Council, be granted a ticket enabling him to attend the Meetings and Excursions of the Society for a period not exceeding six months at a charge of **Fifteen Shillings.**

(*e*) The Council shall have power to extend the hospitality of the Society to distinguished Visitors.

(*f*) The Council shall have power temporarily to alter or suspend this Rule or any part of it.

Note.—Nothing in this Rule shall prevent the Chairman of a Section from introducing, at any time, a non-member who offers a communication of interest to his Section.

Charges for Meetings

22.—The Council shall have power to make a charge to Members for admission to any Meeting the holding of which involves special expenses, and may arrange for the admission of Non-Members.

Expulsion

23.—The power of expulsion of a Member from the Society for objectionable conduct shall be vested in the Council and exercised at a Special Meeting called for that purpose. Notice of the proposed expulsion must be given on the circular convening the Meeting. The expulsion must be carried by a majority of two-thirds of those present.

The Member affected shall have power to appeal to a General Meeting of the Society to act by the like majority.

The Annual and Special Meetings

24 (*a*).—The Annual Meeting shall be held in the month of October.

(*b*) At this Meeting the President, the Chairmen of Sections, the Honorary Treasurer, the Honorary Secretary, the Honorary Librarian, the Honorary Editor, the Honorary Curator, not more than ten Members of the Council and two Auditors for the ensuing year shall be elected, either Auditor having the power to audit the accounts in the absence of the other.

(*c*) At this Meeting the Council's Report for the past year, and the Honorary Treasurer's statement of accounts duly signed by the Auditors, shall be submitted.

(*d*) Notice convening an Annual or Special Meeting, together with the agenda and details of any proposed alterations in the Rules, shall be given to Members at least seven clear days before such Meeting is held. Notice of General Meetings shall be given at least seven clear days beforehand.

(*e*) On a written Requisition, signed by at least ten Members of the Society, the Council shall call a Special Meeting to consider any question as to the affairs of the Society, such Meeting to be called within three weeks of the Council Meeting next following the receipt by the Honorary Secretary of the Requisition, and at least seven clear days' Notice shall be given to the Members. At such Meeting no other business than that mentioned on the Requisition, and on the notice convening such Meeting, shall be considered.

(*f*) At the Annual Meeting and at all Special Meetings of the Society, not less than twenty-five Members shall form a quorum.

Section

25 (*a*).—The Council shall have power to form a Section for the study of any special subject deemed within the scope of the Society's work, and shall appoint the Chairman for the first year.

(*b*) The Chairman of each Section shall appoint a Secretary for the Section, who, in addition to the ordinary secretarial duties, shall keep a list of the Members of the Section.

(*c*) A Section shall consist of those Members who have signified to the Honorary Secretary or the Secretary of the Section their wish to belong to that Section.

(*d*) The Members of each existing Section shall, at a Meeting held before the last week in July in each year, nominate the Chairman of the Section for the ensuing year to come into office after the Annual Meeting. The Secretary of the Section shall send such Nomination to the Honorary Secretary in time to present it at the Council Meeting held on the last Monday in July.

(*e*) If the Council approve of the Nomination, it shall recommend the person nominated for Election at the Annual Meeting, otherwise it shall refer the matter back to the Section. In the event of a Section failing to nominate a Chairman, the Council shall have the right to do so. The final Election shall take place at the Annual Meeting.

(*f*) At the request of the Sectional Chairman the Secretary of a Section may attend Meetings of the Council, but without the power of voting.

(*g*) Each Sectional Chairman shall be responsible for the preparation and arrangement of each Sectional Meeting and Excursion, and shall furnish details of the same to the Honorary Secretary for submission to the Council. At the end of each Session he shall render to the Honorary Treasurer an account of his receipts and payments for the Section.

NOTE.—As under Rule 15.

(*h*) A Minute Book for each Section shall be kept in which shall be entered details of the Section's work and an account of all Sectional Meetings, with the number of Members attending and notes on any matters of interest observed or discussed. Such book shall be submitted to the Council whenever required. The Chairman of each Section shall send to the Honorary Secretary a report of the Section's work for the year in time for it to be epitomised in the Council's Report to the Annual Meeting.

26.—Alterations in the Rules must be sanctioned by a majority of not less than two-thirds of the Members present and voting at the Annual Meeting, or at a Special Meeting called for that purpose, and no alterations shall otherwise be made. Alteration in Rules

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To the Honorary Secretary,

Bournemouth Natural Science Society,

39, CHRISTCHURCH ROAD, BOURNEMOUTH.

Dear Sir,

I beg to propose that

M..

(Please give Christian name in full, and state title—Mr., Mrs., Miss, etc., and any degrees or qualifications.)

Address..

....

**who is personally known to me*
**who has produced satisfactory credentials to me* *be elected an* **Ordinary* / **Associate*
Member of the Society.

Date................ *Member's Signature* ....

I beg to second the above proposal

Date................ *Member's Signature*...............................

*Delete word not applicable. See extract from Rules on reverse of this form.

FORM OF LEGACY.

The following Form of Bequest is recommended for adoption by those who may be desirous of leaving by Will money for promoting the objects and work of the Society :—

I give absolutely to the Treasurer for the time being of the Bournemouth Natural Science Society of No. 39 Christchurch Road, Bournemouth, for the general purposes of the Society the sum of £ s. d. free of duty, and I declare that the receipt of the said Treasurer for the time being shall be sufficient discharge for the said legacy.

Annual Meeting, 1928.

The Twenty-fifth Annual Meeting was held at 39 Christchurch Road, on Saturday, October 27th, at 3 p.m., the Chair being taken by the Rev. C. O. S. Hatton.

The Minutes of the last Annual Meeting and the Council's Report for the past year were read by the Hon. Secretary, and the Annual Statement of Accounts was presented by the Hon. Treasurer.

Report and Statement were adopted on the proposition of Mr. Longbottom, seconded by Dr. Shann.

A cordial vote of thanks to the retiring President, Mr. Heywood Sumner, F.S.A., for his excellent work and for the general interest he has taken in the Society's operations, was moved by Dr. Penrose, seconded by Rev. Professor Potter and carried.

The Chairman then proposed the election of Mr. Claude Lyon to the vacant office, enlarging upon the generous support that he has given to the Society for many years. This proposal was carried by acclamation, and Mr. Lyon was declared duly elected President for 1928. There followed the re-election of Officers, proposed by Dr. Hurry and seconded by Miss Rooke, and of the Council, proposed by Mr. Richey and seconded by Col. Starr; also of Chairmen of Sections, with the addition of Mr. L. B. Benny, M.A., B.Sc., F.R.A.S., in the Astronomical Section, and of Dr. Crallan, M.A., M.B., M.R.C.S., in the Physical Section, of which they have been Acting Chairmen in the past year. This was moved by the Chairman and seconded by Col. Dodd. Miss Twemlow then offered the grateful thanks of the Society to the Hon. Auditors for their past services, and proposed their re-election; this was seconded by Mr. Whitaker and carried.

To avoid any possible future misunderstanding slight additions, involving no new principle, to Rule 21, and to Rules 15 and 25 (g) were made, the former on the proposition of Mr. F. B. Taylor, the two latter by the Chairman; all were duly seconded and carried.

Dr. Crallan then submitted the names of Rev. C. O. S. Hatton, B.A., F.L.S., Heywood Sumner, F.S.A., and Henry Bury, M.A., F.L.S., F.G.S., and proposed their election as additional Vice-Presidents; the motion was seconded by Dr. Penrose and unanimously carried.

The Chairman next introduced the subject of the proposed New Lecture Hall, and, with the help of a diagram, explained the details of the plan and of the necessary reconstruction and re-arrangement of the existing building. This led to an interesting discussion, in the course of which various suggestions as to the financing of the scheme were made by members. The Chairman undertook that these would be carefully considered by the Council, and that the matter would be brought up again for the consideration and support of the Society. The proceedings terminated with a very cordial vote of thanks to the Chairman, proposed by Mr. John Williams and seconded by Major Moore.

Council's Report, 1928.

THE Council has pleasure in presenting its Twenty-fifth Annual Report.

The number of Members now is 586. At the last Annual Meeting it was 608.

There are now only 7 original Members left after a successful and happy career of a quarter of a century. The number of Honorary Members is now 13, and of Associate Members 23. The number of Past Presidents still on the Roll is 5.

During the past year the following General and other Meetings have been held :—

Annual Meeting
Presidential Address
6 General Lectures
69 Sectional and other Meetings
8 General Excursions
42 Sectional Excursions

making a total of 127 Meetings and Excursions. Last year the total number was 113.

General Lectures and Meetings.

(*Illustrated by Lantern Slides.)

1927.
Oct. 15.—Annual General Meeting.
Oct 22.—Presidential Address, by Mr. Heywood Sumner, F S.A., "Archæological Benefactors of Hampshire, Dorset and Wiltshire."
*Oct. 29.—"Our Wondrous Prehistoric Past," by Dr. T. F. G. Dexter, B.A., B.Sc., Ph.D.
*Nov. 19.—"Electricity in the Home," by Mr. G. S. Francis, B.E.D.A.
1928.
*Feb. 1.—"Thunderstorms," by Dr. G. C. Simpson, C.B., F.R.S., F.R.Met.S.
*March 24.—"The History of Bells." by Mr. R. Quick, F.S.A. (Scot.).
*May 5.—"In Chichester with a Camera," by Mr. E. Dodshon, Ll.B.
*Oct. 15.—"Ireland," by Mr. R. K. Cardew, B.A.

Sectional Lectures and Meetings.

Archæological and Historical Section.

1927.
*Dec. 7.—"Pembrokeshire; Its Castles and Peoples," by Mr. R. K. Cardew, B.A.
*Dec. 12. "Avebury," by Mr. H. St. George Gray.
1928.
*Jan. 7.—"Delos, Delphi, and Olympia," by Mr. H. Symes, M.A.
*Jan. 17.—"The Recent Pokesdown Excavations," by Dr. R. C. C. Clay, F.S.A.
*Jan. 28.—"Life in Saxon England," by Mr. F. W. Robins, F.R.G.S.

*Feb. 11.—" Stonehenge," by Col. E. B. Anderson, C.B.E.
*Feb. 25.—" Life in a Monastery," by Mr. F. W. Robins, F.R.G.S.
March 6.—" The Bronze and Early Iron Ages."
by Rev. E. H. Goddard.
March 19.—" The Domesday Manor of Dudsbury."
by Lt.-Col. C. D. Drew, D.S.O.
April 12.—To arrange Summer Excursions.

Astronomical Section.

1927.
*Nov. 17.—" The Moon "; " The Recent Total Solar Eclipse,"
by Mr. F. W. Longbottom, F.R.A.S.
1928.
Jan. 25.—" Astronomy through the Ages,"
by Mr. L. B. Benny, M.A., B.Sc., F.R.A.S.
March 10.—Discussion on possible lines of work for Amateur Astronomers; opened by Mr. F. W. Longbottom, F.R.A.S., and Mr. Claude Lyon.
*April 17.—" The Geography of the Sky,"
by Mr. F. B. Taylor, B.A.

Botanical Section.

1927.
*Nov. 29.—" Some Timber-Destroying Fungi,"
by Rev. Prof. M. C. Potter, M.A., D.Sc., F.L.S.
Dec. 16.—" Notes on Landscape and Surface Soil,"
by Mr. L. Beeching Hall, F.L.S.
1928.
Jan. 3.—" Evolution—Its Present Phase,"
by Mr. W. Munn Rankin, M.Sc., B.Sc.
Jan. 14.—" At Home."
Feb. 21. " Mosses," by Mr. H. N. Dixon, M.A., F.L.S.
*March 22.—" Self-Protection in Plants,"
by Rev. C. O. S. Hatton, B.A., F.L.S.

In addition to the above, six Informal Meetings of the Section have been held during the winter session, at which the following short addresses were given and rare specimens of plants were exhibited and discussed :—

1927.
Nov. 8.—" Do Plants Breathe?" by Miss H. V. Davies, B.Sc.
Dec. 6.—" Cobaea Scandens,"
by Surgeon-Captain G. G. Borrett, R.N.
1928.
Jan. 10.—" Plants seen during 1927,"
by Mr. L. Beeching Hall, F.L.S.
Feb. 14.—" Soils," by Mr. R. K. Cardew, B.A.
March 13.—" Labiatæ," by Mr. J. Vorse.
April 10.—To arrange Summer Excursions.

Entomological Section.

1927.
Nov. 16.—" The Comma Butterfly (Vanessa C-album),"
by Mr. Howard Lacey, B.A.
Dec. 15.—" Remarks on Spiders," by Mr. Howard Lacey, B.A.
1928.
Jan. 14.—" At Home."
Jan. 19.—" Remarks on Butterflies of the Genus Lycaenidæ,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
Feb. 16.—" Insects, Home and Foreign,"
by Surgeon-Captain G. G. Borrett, R.N.
March 15.—" Curiosities of Ant Life," by Mr. S. Whitaker.

Geographical Section.

1927.
*Nov. 12.—" A Voyage to South Africa," by Alderman H. Robson, J.P.
*Dec. 2.—" London Underground Railways," a contributed paper, read by Mr. Claude Lyon.
1928.
*Jan. 4.—Lecture for Children, " The Marvels and the Beauties of Nature," by Mr. Claude Lyon.
*Jan. 13.—" Cuzco and the Inca Country," by Miss E. E. Twemlow.
*Jan. 21.—" The Glory that was Greece," by Mr. G. Long, J.P., F.R.G.S.
*Feb. 7. " Through Pre-War Russia," by Dr. W. G. A. Robertson, M.D., D.Sc., F.R.C.P., F.R.S. (Edin.), F.S.A. (Scot.)
*March 7.—" Motor 'Buses," a contributed paper, read by Mr. Claude Lyon.
*March 17.—" In the Heart of Old Rouen " (Part I.), by Mr. E. Dodshon, Ll.B.
March 31.—" Afghanistan and the Afghans," by Mr. G. B. Scott, C.I.E.
*April 14.—" The Old World and its Expansion from Biblical times to the last Century," by Mr. J. Williams.
*April 21.—" In the Heart of Old Rouen " (Part II.), by Mr. E. Dodshon, Ll.B.
April 28.—" At Home."

Geological Section.

1927.
*Nov. 5.—" The River Solent, and Tributaries," by Mr. H. Bury, M.A., F.L.S., F.G.S.
*Dec. 10.—" The Evidence of Man's Antiquity," by Mr. H. Bury, M.A., F.L.S., F.G.S.
1928.
*Feb. 20.—" The Recent Discovery of Fossiliferous London Clay in Dorset," by Mr. E. St. John Burton, F.G.S., F.Z.S., F.L.S.
And
A Description of the Society's Geological Lantern Slides, by Mr. R. K. Cardew, B.A.
*March 27.—" The Geology of Jersey," by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.

Microscopical Section.

Exhibitions of Objects of Interest, with the following Special Subjects:—
1927.
Oct. 19.—" Feet of Insects."
Nov. 16.—" Seeds."
Dec. 15.—" Mosses."
1928.
Jan. 14.—" At Home."
Jan. 19.—" Antennæ of Insects."
Feb. 16.—" Mouths of Insects."
March 15.—" Wings of Insects."
April 19. " Miscellaneous Botanical Objects."
May 17.—" Vegetable Hairs."
June 21.—" Fern Spores."
July 19.—" Pond Life."
Aug. 16.—" Pond Life."
Sept. 20.—" Pollen."
Oct. 18.—" Diatoms."

Photographic and Record Section.

1928.
*Feb. 15.—" Exhibition of Members' Work for the Year,"
by Mr. W. Dieselhorst, A.M.I.C.E.
*March 21.—" Amateur Photographer " Prize Slides,
by Mr. W. Dieselhorst, A.M.I.C.E.

Physical Section.

1927.
*Nov. 24.—" Gold: its Production and Uses,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
1928.
Jan. 23.—" Electric Discharges through Gases,"
by Mr. R. M. Clark, B.Sc., M.C.
*Feb. 23.—" Atoms and Crystals,"
by Miss Marcia Penrose, B.Sc.
*March 29.—" Glass and Glass-Making,"
by Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S.
April 26.—" How a Broadcast Receiver Works,"
by J. G. Griffiths, A.M.I.R.E.

Zoological Section.

1927.
*Dec. 1.—" The Common Cat,"
by Dr. W. G. A. Robertson, M.D., D.Sc., L.R.C.P., F.R.S. (Edin.), F.S.A. (Scot.)
1928.
Feb. 28.—" British Birds of Prey," by Dr. S. H. Snell, M.B.O.U.

General Excursions and their Leaders.

1928.
April 18.—Salisbury Museum, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U.
May 12.—Chichester, Mr. E. Dodshon, Ll.B.
May 18.—Corfe Mullen, and Hampreston, Mr. H. A. Richey, B.A.
June 13.—Through Rural Dorset, Dr. S. H. Snell, M.B.O.U.
July 28.—Longford Castle, Dr. J. Hartley.
Aug. 23.—Puddletrenthide, Mr. R. K. Cardew, B.A.
Sept. 14.—Netley Abbey, Mr. H. A. Richey, B.A.
Oct. 26.—Autumn Tints in the New Forest, Dr. S. H. Snell, M.B.O.U.

Sectional Excursions and their Leaders.

1927.
Oct. 25.—Round Poole Harbour to Study Bird Life, Dr. S. H. Snell, M.B.O.U. (Zoological.)
1928.
April 24.—Studland Heath. (Botanical.)
May 2.—Wareham, Mr. Howard Lacey, B.A. (Botanical and Entomological.)
May 3.—Pylewell Park, Mr. Claude Lyon. (Geographical.)
May 9.—Dudsbury and West Parley, Mr. R. K. Cardew, B.A. (Archæological and Historical.)
May 10.—Wimborne, Mr. R. K. Cardew, B.A. (Botanical and Entomological.)
May 15.—Kimmeridge, Mr. St. John Burton, F.L.S., F.G.S., F.Z.S. (Geological.)
May 16.—Sway, Mr. J. Vorse. (Botanical and Entomological.)
May 22.—Gain's Cross, Miss M. E. Curme. (Botanical and Entomological.)

May 24.—Camelot, Mr. R. K. Cardew, B.A. (Archæological and Historical.)

June 1.—Corfe, Miss Rogers Barnes. (Botanical and Entomological.)

June 5.—Bransgore House and Colbourne's Wood, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological.)

June 6.—Studland, Mr. H. Bury, M.A., F.L.S., F.G.S., and Mr. St. John Burton, F.L.S., F.G.S., F.Z.S. (Geological.)

June 7.—Oakley Down, Cranborne Chase, Col. E. B. Anderson, C.B.E. (Archæological and Historical.)

June 11.—Walhampton, Mr. Claude Lyon. (Geographical.)

June 19.—Milford and Keyhaven, Dr. F. G. Penrose, F.R.C.P., F.Z.S., M.B.O.U. (Botanical and Zoological.)

June 20.—The Norman Lockyer Observatory, Sidmouth, Mr. L. B. Benny, M.A., B.Sc., F.R.A.S. (Astronomical.)

June 25.—Swanage and the Quarries, Mr. Claude Lyon. (Geographical.)

June 26.—Bloxworth and Bere Regis, Miss S. G. Rooke. (Botanical and Entomological.)

July 3.—Moreton to Warmwell, Miss S. G. Rooke. (Botanical and Entomological.)

July 10.—Chapman's Pool, Mr. Howard Lacey, B.A. (Botanical and Entomological.)

July 11.—Bloxworth, Puddletown and Stinsford, Mr. Claude Lyon. (Geographical.)

July 16.—Devizes Museum and Castle Grounds, Col. E. B. Anderson, C.B.E. (Archæological and Historical.)

July 20.—Economic Plants at King's Park Nurseries, Dr. Jamieson B. Hurry, M.A. (Botanical.)

July 24.—Sway to Brockenhurst, Mr. J. Vorse. (Botanical and Entomological.)

July 31.—Buckland Rings and Setley Plain, Mr. Heywood Sumner, F.S.A. (Archæological and Historical.)

Aug. 2.—Corfe River, Surgeon-Captain Borrett, R.N. (Botanical and Entomological.)

Aug. 8.—Wareham, Mr. H. J. Wadlow. (Botanical and Entomological.)

Aug. 13.—Holmsley and Thorney Hill, Rev. C. O. S. Hatton, B.A., F.L.S. (Botanical and Entomological.)

Aug. 15.—Hengistbury Head and Mudeford, Mr. R. K. Cardew, B.A. (Geological.)

Aug. 17.—New Alresford and Chilton Candover, Col. E. B. Anderson, C.B.E. (Archæological and Historical.)

Aug. 20.—Spetisbury and the Tarrant Valley, Mr. R. K. Cardew, B.A. (Botanical and Entomological.)

Aug. 30.—Brockenhurst, Mr. J. Vorse. (Botanical and Entomological.)

Sept. 6.—Studland Heath. (Botanical and Entomological.)

Sept. 11.—Worth Matravers and Winspit, Mr. E. St. John Burton, F.G.S., F.L.S., F.Z.S. (Geological.)

Sept. 13.—Denny Bog, Mr. L. Beeching Hall, F.L.S. (Botanical and Entomological.)

Sept. 18.—Moreton, Mr. H. J. Wadlow. (Botanical and Entomological.)

Sept. 25.—The Bournemouth Wireless College, Dr. G. E. J. Crallan, M.A., M.B., M.R.C.S. (Physical.)

Sept. 27.—Creech Barrow, Surgeon-Captain G. G. Borrett, R.N. (Botanical and Entomological.)

Oct. 2.—Dewlish and Culpepper's Dish, Mr. H. Bury, M.A., F.L.S., F.G.S., and Mr. R. K. Cardew, B.A. (Geological.)

Oct. 11.—Fungus Foray (Brockenhurst), Mr. J. F. Rayner, F.R.H.S., M.B.Myc.S.

Oct. 23.—Lyndhurst Road, Mr. L. Beeching Hall, F.L.S. (Botanical and Entomological.)

Of the General Lectures, the most interesting was that on "Thunderstorms" by Dr. G. C. Simpson, C.B., F.R.S., F.R.Met.S., the Director of the Meteorological Office. This lecture was given in the Large Hall of the Municipal College, to a crowded audience. The lecture was freely illustrated with magnificent lantern slides, many of which were taken by the lecturer himself, who kept his listeners deeply interested to the very end. The root idea of Dr. Simpson's lecture was what he called the "Breaking Drop Theory," i.e., that a falling drop of rain, on breaking up, attracts to itself positive electricity and repels negative electricity into the surrounding atmosphere.

Other noticeable General Lectures, which also aroused great interest, were those on "Our Wondrous Prehistoric Past," by Dr. T. F. G. Dexter, B.A., B.Sc., Ph.D., and on "Electricity in the Home" by Mr. G. S. Francis, of the British Electrical Development Association.

The Sectional Lectures this year may be considered to have reached a higher standard of excellence and interest than usual, and it is difficult to say which were the most noteworthy. The following may be especially mentioned:—"Pembrokeshire, its Castles and Peoples," by Mr. R. K. Cardew, B.A.; "Avebury," by Mr. H. St. George Gray; "The Bronze and Early Iron Age," by the Rev. E. H. Goddard; "Astronomy through the Ages," by Mr. L. B. Benny, M.A., B.Sc., F.R.A.S.; "Evolution, its Present Phase," by Mr. W. Munn Rankin, M.Sc. (Leeds), B.Sc. (London); "Through Pre-War Russia," by Dr. W. G. A. Robertson, M.D., D.Sc., F.R.C.P., F.R.S. (Edin.), F.S.A. (Scot.); "Afghanistan and the Afghans," by Mr. G. B. Scott, C.I.E.

The General Excursions were all interesting and well-attended. Details of some of these and also of some of the Sectional Excursions will be found in the "Proceedings," pp. 40-57. An attempt was made this year to introduce a series of short afternoon excursions, but not very successfully; it was thought that some members might like them as an addition to the whole-day excursions.

At the last Annual Meeting, the President, Mr. Heywood Sumner, F.S.A., was unanimously re-elected President for a second year of office. He gave his second Presidential Address on Saturday, October 22nd, in the Large Hall of the Municipal College; the title of the address was "Archæological Benefactors of Hampshire, Dorset and Wiltshire." It was the tribute of an archæologist to the labours of his predecessors in the field of archæology, for whose help he had often been grateful, and yet whose names seemed sometimes in danger of being forgotten.

The Council desires to express its gratitude for Mr. Sumner's two years' Presidency and for his great practical help to the

Society in giving lectures on archæological subjects, and conducting excursions to pre-historic sites. His work will be remembered gratefully.

The Council is pleased to announce that Mr. Claude Lyon has kindly allowed himself to be nominated as the new President.

The Wild Flower Exhibition at the Lansdowne Public Library still attracts the keen interest of students and of the general public. Large numbers of botanical specimens are brought for identification, both from local districts and from other counties. This branch of the Society's work is of special educational value, and is also very helpful to visitors to the town. The Bournemouth Education Authorities contribute the out-of-pocket expenses, but the work is carried out by the following members of the Society :—Miss Rooke, Miss S. Wetherell, Miss Parton, and Mr. H. J. Wadlow.

The Garden Committee have very little to report this year.

The following members have given plants :—Mrs. Speakman, Kalmia latifolia; Miss S. Wetherell, Philadelphus (mock orange); Mr. H. Backhouse, Wistaria chinensis; Dr. J. B. Hurry, Eucalyptus Globosus.

The Economic Garden continues to create much interest, and its usefulness has been much increased by the provision of very legible labels, provided by Mr. Hatton and Mr. Brumell. The thanks of the Society are due to Miss S. Wetherell who has undertaken the entire charge of this department.

It has been found necessary to remove some of the overgrown shrubs at the west entrance gate. Owing to the impossibility of seeing into the road the exit was becoming dangerous. Their place has been supplied by choice shrubs raised in the garden. Though the winter was a severe one, we have no deaths to report among the more delicate plants. We have, however, lost two established plants growing against the house, viz., Clianthus Puniceus (lobster plant or parrot bill), and Carpenteria Californica. These had to be removed, with the rest of the climbers on the south and west walls of the house, when the work, to ensure the house being kept dry, was carried out.

The Garden Committee regret that more use has not been made of the croquet set supplied last year. They are fully aware that the ground is very far from level, and that the quality of the grass leaves much to be desired, but they do not feel justified, in the present state of the Society's finances, in incurring the considerable expenditure which would be necessary in re-making the lawn.

Besides a large number of books presented to the Library, the following gifts have also been made to the Society during the past year:—A case of Flint-lock Pistols, by Mr. Howard Lacey; a collection of British Land and Fresh-water Shells, and also a collection of London-Clay Fossils, by Mr. E. St. John Burton; a table cloth, by Miss Marcia Penrose; fifty cases of Birds (being surplus specimens of the Salisbury Museum), by Mr. Frank Stevens, the Curator.

The Council, having received several and long-continued complaints about the ill-ventilated and frequently overcrowded condition of the Lecture Hall, appointed a Committee last December to consider the question of providing new and adequate accommodation. This Committee held frequent meetings, drew up plans for the new room, and issued an appeal to members for conditional promises of subscriptions should the scheme materialise. In response to the appeal, a sum of £370 was conditionally promised. The Committee made their report in May, and, as the lecture season was then ended, the Council decided to suspend the matter until November, and then again discuss it.

The Council tenders its thanks to the following ladies for so kindly helping with the teas during the lecture season:—Miss Rooke, Miss Ousby-Trew, Mrs. Rees Howell, Miss McBean, Miss M. Wetherell, the Misses Veale and Miss Roden; also to the following gentlemen for working the lantern at lectures:—Mr. Hayes Barratt, Surgeon-Captain Borrett, R.N., Mr. Dieselhorst, Mr. Dodshon, Mr. Lyon, Mr. Wadlow, Mr. Whitaker, and Mr. Williamson.

The Council is very glad to report that the Astronomical Section has now succeeded in getting a new Chairman, the post having been vacant since Mr. Peek left the district. The new Chairman is Mr. L. B. Benny, M.A., B.Sc., F.R.A.S. He is assisted by Mr. F. W. Longbottom, F.R.A.S., as secretary to the section. The section is now once more in full activity.

The Council reports, with regret, the deaths of the following members during the past year:—Alderman J. E. Beale, the first President of the Society, viz., in 1903, in which year he was also the Mayor of Bournemouth; Mr. Herbert Potter; Mr. Henry Ellis, F.R.A.S., who was a member for 6 years; Rev. E. F. Linton, M.A., F.L.S., who was an original member and afterwards an Honorary member, a Morris Gold Medallist, and an author on botanical subjects; Col. Hutchinson, D.S.O., who died with tragic suddenness; Mrs. Curme, a valued member of the Society for 15 years, and a member of the Council for 7 years; Miss La Touche, a member for 9 years; Major F. W. Ensor, M.A., B.C.L.; Dr. S. C. Lawrence, M.B.; Mr. T. Mattocks; Mr. S. H. Mangin; Mr. H. E. Swain.

For the Conference of the South-Eastern Union of Scientific Societies we were unable to send a delegate this year.

The British Association for the Advancement of Science, held their meetings in Glasgow this year, and, once more, Mr. Claude Lyon acted as our delegate; he has prepared a report of the proceedings at the Conference of Delegates, which he read to the Council at their meeting this month, and for which they warmly thanked him.

In conclusion, the Council sincerely thanks all those who have presented objects of interest and of use, or given Lectures, or conducted Excursions, and especially those owners and occupiers who have kindly permitted the Society to visit the several places of interest controlled by them.

Summary of Accounts for the Year ending 30th September, 1928.

RECEIPTS.

Current A/c	£	s.	d.
Members' Subscriptions	497	15	0
Donations to General Fund	11	1	6
Sale of Proceedings of the Society	1	8	6
Sale of Index to Proceedings	0	12	0
Rent from Tenants	130	0	0
Letting of Hall	1	16	6
Donation for Library	1	10	0
Refund of cost of Wild Flower Exhibition in 1926 from Bournemouth Education Committee	1	10	8
Refund of cost of Wild Flower Exhibition in 1927 from Bournemouth Education Committee	2	3	2
Surplus from Excursions, including £1 9s. 9d. in respect of 1927	13	4	5
Sale of Sundries	1	10	0

PAYMENTS.

	£	s.	d.	£	s.	d.
Interest on Debentures	180	12	0			
Less Tax	36	2	5			
				144	9	7
Income Tax under Schedule D ...				9	6	0
Maintenance of the Society's House:—						
Rates and Property Tax ...	73	3	0			
Water, Light and Heat ...	32	18	2			
Wages	73	4	7			
Insurance	9	5	3			
Share of Telephone	3	3	0			
Furnishing and Upkeep ...	116	16	7			
				308	10	7
Secretarial Expenses:—						
Printing and Stationery ...	35	16	7			
Postage	31	3	11			
Other Expenses	15	0	0			
				82	0	6
Maintenance of Garden:—						
Wages	33	6	0			
Other Expenses	3	2	0			
				36	8	0
Special Expenses of Museum ...				2	10	0
Special Expenses of Library ...				12	17	6
Special Expenses of Lectures ...				13	3	6
Subscriptions to other Societies ...				2	3	6
Cost of Wild Flower Exhibition during 1927				2	3	2
Cost of Vol. XIX of Proceedings of the Society				60	11	0
Part Cost of Vol. XX of Proceedings of the Society				2	8	9

	£ s. d.		£ s. d.
		Architect's Fee, reporting as to New Hall	7 7 0
	662 11 9	Debenture Redeemed	10 0 0
Balance from previous year	116 16 8	Sundry	0 8 0
Debenture interest not claimed	2 8 0		694 7 1
		Balance at Bank	87 9 4
	£781 16 5		£781 16 5

RECEIPTS.	£ s. d.	PAYMENTS.	£ s. d.
Deposit A/c			
Balance brought forward	66 6 11	Balance on deposit	81 12 10
Interest to December 31st	1 12 11		
Donation	13 13 0		
	£81 12 10		£81 12 10

	£ s. d.
Archæological Research Fund, Cr. Balance ...	15 4 8
Building Fund, Cr. Balance	15 0 0

G. BRUMELL,
Hon. Treasurer,
1st October, 1928.

We have examined the above Accounts with the Books of the Society and the Vouchers for payments and certify the same to be correct.

Bournemouth,
22nd October, 1928.

(Signed) EDWARD BICKER,
Incorporated Accountant.
C. H. BLACKETT,
Hon. Auditor.

Report of Summer Excursions, 1928.

Chichester. This Excursion on May 12th was made doubly interesting by reason of a lecture by Mr. Dodshon a week beforehand, copiously illustrated by lantern slides of the city and of details of the Cathedral architecture. A halt was made at Titchfield to visit the church with its quaint shingled western spire (1450), its Norman inner porch doorway, and the imposing Elizabethan tomb of the Wriothesley family, Earls of Southampton; and the city was reached soon after noon. A visit was first paid to the broad north wall, from the causeway of which several good views of the north side of the Cathedral are obtained. Passing by the famous City Cross (1502) and the Gate House of the Bishop's Palace, the party entered the beautiful and extensive gardens, bounded by the massive South and East City Walls, with their high inner banks, and here, by the kind permission of the Bishop, the mid-day rest was taken under a fine Catalpa tree. The palace and other buildings of the precincts are largely constructed of dressed flints.

In the Cathedral the party enjoyed the privilege of an address by Professor E. S. Prior, Slade Professor of Architecture at Cambridge University, and a resident in Chichester. Looked at from standpoints of design and taste, said the Professor, Chichester has its structure decked out for us in modern fashion, so that we can only understand its ancient art by dismissing from our view all the decorative additions, and moreover have to reckon how its bare structure has been stripped of practically all the sculptural and painted significance which once adorned it. Still, as mason's art, Chichester has much for the student in still retaining the tool marks of its mediæval dressings. The fabric has been planned and built by a succession of mason crafts. At the time of its first setting out, A.D. 1088, the Benedictine institution was reconstituting the civilisation of West Europe by the crafts of church-building. Brought to England by the Normans, the science of church-building proceeded to evolve from Romanesque structure the Gothic style, and recreated the fine arts of architecture, sculpture and painting in the service of religious expression.

Three chapters of craft expression marked the Chichester working of stone, each symptomatic of a religious evolution as well as of the working economy of masonry. First was the replacing of the hammer touch of Saxon sculpture by the broad diagonal axing of the ashlar walling, at Chichester used on the coarse Bembridge shell-stone, but growing finer and thinly jointed in the close-grained Binsted from Quarr Abbey. After 1150 we see this use accompanying the delicate sculptures of English style in the hard Caen oolite, and with them came the

Purbeck marble shafting from Swanage. The Interdict closed the era; but in 1212, on the return of the banished Bishops, there began that notable English art of building which, separating from the French, worked, in the cult of the Lady Chapel, the replacement of apses by square-ended gabled halls. For the Gothic there was in use a notched chisel, which after 1250 rendered stone with a delicate surfacing of " claw " marks. For the 130 years of its use at Chichester Caen oolites were the chief material for the building of the side chapels and the vaulting of the nave and choir, whose flying buttresses and pinnacles complete the exterior of the Cathedral. Internally, after 1300 the big, hard chalk of the Beer quarries begins to be used, finished with the " drag " and painted on direct.

The Black Death of 1349 brought about a cessation of building, and was followed by a new era and system of design. At Chichester the coarse sandstones of Ventnor are roughly chiselled for exterior work, and used for the big window-works of Gloucester masonry. At the same time Caen oolite was imported for the level-headed windows of wood-ceiled halls, while Beer stone in chantry enclosures and monuments; alabaster for memorial sculpture; and wood, richly painted and figured, made stalls and screens. Such varied sources of style indicate how the structural art of the building mason was detaching itself from the practice of shop furnishers. And so the mediæval period of art ends at Chichester, as elsewhere, with the coming of a Renaissance painter brought by Bishop Sherburn about 1535 to paint ceilings and portraits.

The dates and periods of mediæval buildings can be fixed by the character of the stone used and by the surface tool marks of the masons, according to the tools used at various periods. Almost all stone wall surfaces and carvings were coloured; and a different surface marking was used during the earlier period, when gesso work was superimposed, as compared with later periods, when the colour was put direct on to the stone. Saxon stone figure carving was much superior to Norman.

From the Cathedral the party passed on to examine the Pudens stone with its Roman inscription, and so to the ancient St. Mary's Hospital, where Professor Prior gave an account of its structure and history. It contains a fine open timber roof, an original carved wooden screen, and several misereres of the same period as those in Christchurch Priory.

Corfe Mullen and Hampreston. This excursion on May 18th was one of a series devised and carried out by Mr. H. A. Richey to meet the views of members who may find the customary long runs rather irksome, but who would gladly devote an afternoon to the study of antiquities not too remote from Bournemouth.

The ancient Chapelry of Corfe Mullen was attached to Sturminster Marshall, but in 1858 it secured its independence as the Church of St. Nicholas, and subsequently became a Rectory, now in the gift of Eton. The building was restored in 1865 and now consists of a 15th century tower of three stories, a nave with cylindrical ceiling divided into compartments with carved bosses at the intersection of the ribs, and a chancel with an early English triple window and modern glass. The font, on a single step, has an octagonal bowl, ornamented on each face with two trefoil arched niches. A brass shows date 1437, but the inscription has been partly destroyed. The churchyard cross was battered in 1643 and now bears a new shaft on the ancient base. Here were distributed various doles founded by the squire, Thomas Pheleps, in 1662, such as " 2d. for bread and 2d. for cheese to 13 poor children every Sunday."

The said Thomas Pheleps figures in the registers which go back to 1652. He was " buried in linnen, and we have received £5 of his wife whereof £2 10s. 0d. to the poor, the other £2 10s. 0d. to the informer according to the statute."

The many interesting features of the architecture were clearly pointed out by Mr. Richey, who subsequently led the party across country to Hampreston. At the Church of All Saints, formerly a chapelry to Wimborne Minster, the Recto kindly took charge and exhibited his list of incumbents from 1362, the silver plate, and a curious entry in the registers of a translation of a Papal Bull of Excommunimation, dated 1738, against one Henry Goldney for " renouncing the errors of the Church of Rome."

The church contains a large hagioscope on the south side, and a font with octagonal bowl on a circular stem and a more ancient base.

Camelot. On May 24th Mr. Cardew conducted an excursion to Cadbury Castle. The route lay through Sherborne, and the first halt was made on the top of Corton Beacon, from which a magnificent view extends over the great plain of Central Somerset, with Glastonbury Tor in the foreground, backed by Quantocks and Mendip. Passing on to Cadbury Castle, the leader gave an interesting account of the site and the traditions attaching to it. Though much obscured by timber, the fortifications are still clearly traceable, and consist of a quadruple series of ramparts and ditches, the interior ring being faced with wrought masonry. The enclosure is an area of about 18 acres, and the crest of the hill is crowned by a mound, locally known as King Arthur's Palace. The hill is completely isolated and its southern face is terraced with lynchets. Explorations of the camp have revealed many interesting relics—coins, slingstones, a silver horse-shoe, and the like.

King Arthur's Well may be found within the lowest rampart, and another is near the keeper's cottage. "King Arthur's hunting track" is a vague forest path running at the base of the hill towards Glastonbury.

Later in the day at N. Cadbury the party was met by the Vicar, who gave an excellent address in the church, which dates back to 1427 and was originally the centre of a college for eight priests. The interior is imposing by reason of its size and excellent proportions. There is a fine chancel, containing some elaborately carved tabernacles, bearing traces of colouring. The roof and bench-ends, dated 1538, are also noteworthy; there are several altar-tombs, fragments of glass in the west window, and a well preserved rood-loft stair and turret.

The return journey was made down the Piddle valley, and if the whole excursion was rather fatiguing, it was noteworthy as affording a visit to the most remarkable of all Somerset earthworks.

Oakley Down. On June 7th an excursion was organised by Colonel Anderson, with the co-operation of Dr. R. C. C. Clay, who met the party at Worbarrow and gave an address on the different types of Barrows and their chronological order. Long barrows, he said, the earliest in date, may be of earth or stones, may be chambered, with or without a passage leading from the outside to the chambers, and there may be a true or a false entrance to the passage. Lateral ditches, which are virtually quarries, as a rule run on each side of long earthen barrows. Stone long barrows sometimes have a surrounding peristalith of standing stones. They are built for burials by inhumation, though traces of fire are often found, and they may have served as ossuaries. Worbarrow was completely excavated by General Pitt-Rivers, and the soil removed was never replaced. The irregularities of the ditch Dr. Clay compared to those in the ditch at Stonehenge which was probably of the same date.

Round barrows of the bell and bowl types as a rule have small enclosing ditches, which were excavated after the mound had been thrown up, and which functioned as boundaries to a sacred spot rather than as quarries from which material for the mound was obtained. Bell barrows have a slight bank outside the ditch and belong to the Early Bronze Age. Thus they often contain skeletons and beakers. Many of the bowl barrows contain cremations in urns and belong to the middle of the Bronze Age. Some, and chiefly those of small height, cover cremations of the early Iron Age. Roman barrows, which are rare, have a berm or ledge running round the lower part of the mound.

Saxon barrows of the pre-Christian period are very rare, but some low round barrows of this date are known, and Dr. Clay described one that he had excavated. At that time the dead were usually interred in flat cemeteries near the bottom of the vallies.

Disc barrows consist of a well-marked encircling ditch, usually with a bank outside, and one or more small mounds within the centre of the area bounded by the ditch. In date these probably overlap the bowl and bell barrows. Twin barrows, that is two bowl-shaped mounds with a single ditch, are of the same date.

The principal distinction between long and round barrows is that the mould for the mound of the latter was collected from the top-soil in the immediate neighbourhood, while in the former case it was quarried from the lateral ditches by the side of the barrows.

Dr. Clay then took the party round the extensive groups of barrows on Oakley Down and pointed out the various types that he had described. He also spoke about Martin Down Camp and other square enclosures of the same period, namely, the overlap of the Bronze and Early Iron Ages. The system of cultivation proper to that period he illustrated by the lynchet system seen on the hill in front of which the party was gathered.

Walhampton. Four years have elapsed since the last visit of the Society to the beautiful grounds of Walhampton House, and in the interval the charm of the gardens with their encompassed chain of lakes has been considerably developed. On June 11th Mr. Claude Lyon, by the kind permission of Lady St. Cyres, and with the co-operation of the head gardener, conducted a party, after preliminary examination of the very curious grotto, over the domain. On the journey there was ample time for a long halt at Boldre Church, now in excellent order, even to the equipment of electric lighting. The situation is strangely remote from the busy world, and there is a theory that the church stands on the site of an ancient monastic cell, which served as a half-way house for pilgrims from Christchurch to Beaulieu Abbey, when there were no roads through the Forest and no passage of the Lymington river save by a ford at Haywood. The parish became known outside its bounds towards the close of the eighteenth century, at a time " when the lower class of the parishioners were little better than a gang of gypsies," through the medium of the Rev. William Galpin, author of a charming work on the Forest, who founded and endowed a school for the education of 20 boys and 20 girls. Galpin's School was a feature of the Boldre Pageant in 1922.

Through Rural Dorset. On June 13th a delightful round in the Hardy Country attracted a large party of members under the guidance of Dr. S. H. Snell. The first halt was made on the summit of Woodbury Hill, the site of the September Fair which boasts an antiquity of some seven centuries and, even in recent times, the most important live-stock sale in Wessex. Formerly it extended over five days—known as Wholesale, Gentlefolks, All Folks, Sheep Day, Pack and Penny Day, the last perhaps the prototype of the Remnant Day of our modern bargain sales. The summit of the hill is encircled by an ancient earthwork, in good preservation, with an oval entrenchment surrounding a vast level green space on which the great sheep fair is held.

A short drive brought the party to Affpuddle Church, where the Vicar pointed out the Norman font, the curiously carved pulpit, the linen-fold bench ends and the monument bearing a coat-of-arms suggesting the origin of the "Stars and Stripes" of the U.S.A. A halt on the heath gave occasion for a discussion on the neighbouring Swallow-Holes, of which Culpepper's Dish is the most striking example. Crossing Ower Heath, glowing with masses of rhododendrons, Warmwell was reached, and later Poxwell, where a glimpse was afforded of the Manor House, with its interesting chambered gateway. A sharp climb by Sutton Pointz brought the party to the crest of the down from which a magnificent view was obtained over Portland Bay; and eventually, by a rugged road through Came Down, Dorchester was reached and offered a pleasant halt. A beautiful drive home via Broadmayne and Wareham brought to an end a novel and fascinating excursion.

The Norman Lockyer Observatory, Sidmouth. On June 20th Mr. L. B. Benny signalised his appointment as Chairman of the Astronomical Section by leading a party of some 20 members on a very noteworthy excursion to Sidmouth, where he had engaged the good offices of the Director, Dr. W. J. S. Lockyer, and his assistants to conduct the party over the various buildings and to explain in detail the work of the Observatory.

The Observatory was founded privately (under the name of the Hill Observatory) in 1913 by the late Sir Norman Lockyer and Lieut.-Col. McClean; later it was formed into a Corporation, and was given its present name, as a memorial to its eminent founder.

The site, which was presented by Sir Norman and Lady Lockyer, is on the top of Salcombe Hill, near Sidmouth, at a height of 560 feet, with an unbroken horizon in every direction. The meteorological conditions are very favourable, and the proportion of fine nights for observation is unusually high.

The intention of the founders was to provide an Observatory for the study of "Solar Physics," a subject in which Lockyer was one of the pioneers; this branch of Astronomy has made very great progress in recent years, and, under the more general title of "Astrophysics," now includes the study of the physical and chemical conditions, and changes taking place in the stars. The work is carried on by spectroscopic analysis of their light, reinforced by laboratory study of spectra interpreted in the light of modern atomic theory.

The routine work of the Norman Lockyer Observatory consists, then, in photographing the spectra of stars, and afterwards in interpreting, discussing, and classifying the spectra. The task must, of course, be undertaken systematically; at present stars of the 5th and 6th magnitudes (on the limits of naked eye vision), in a certain area of the sky, are under investigation. The results that have been accumulated, during the life-time of the Observatory, are of the greatest value and importance, and include the complete spectroscopic history of several notable "novae." The instrumental equipment includes the "Rusthall" equatorial, a twin telescope with object-glasses of 12- and 10-inch aperture, the former fitted with a 12-inch prism of 20 degrees angle for producing the Stellar spectrum, and a camera at the eye end for photographing the spectrum, while the 10-inch is for visual use only; and the "Kensington" equatorial (originally at South Kensington), fitted in a similar manner, but with a larger dispersion than the "Rusthall," and used for obtaining spectra of the brighter stars. There is also a large reflecting telescope with a 30-inch mirror by Common, for which a dome has yet to be built, and a 20-inch siderostat, worked in conjunction with a 9-inch prismatic camera.

Members of the party were interested to see the spectra of stars, as originally photographed, as fine lines, and then as broadened into bands of the familiar form, for comparison with standard spectra.

No element was lacking to complete the success of the excursion. The long drive was free from motor casualty, the weather was perfect. The visit to the observatory was followed by a pleasant social gathering, graced by the presence of Dr. and Mrs. Lockyer, which gave an opportunity for the expression of the thanks of the party for their most kind reception. It is understood that an invitation to repeat the visit next year was cordially offered, and it will probably be gratefully accepted.

Swanage Quarries. On June 25th an excursion, organised by Mr. Claude Lyon, was carried out under the guidance of local owners. Mr. G. Hancock first took charge of the party and led the way to his fashioning-yard. Here were seen paving-stones, roofing slabs, bird baths, etc., made from the freestone, marble, and other rocks of the Purbeck beds, which extend at various depths from Peveril Point to Tyneham. Where the rock crops out it is worked in open quarries, elsewhere it must be quarried underground.

Passing on to Gallows Gore, above Langton Matravers, an open quarry was inspected and afterwards the beautiful Purbeck marbles in Kingston Church. The early Norman Church at Worth Matravers was next visited on the way to Herston, where an underground quarry was shown by the owner, Mr. Tomes. Here the workings lie at a depth of some sixty feet, and the rock is hauled up an incline. The descent of the party was by steep, rough steps into the active area of operations, the details of which were clearly explained to the party.

Stinsford and Bloxworth. On July 11th Mr. Claude Lyon conducted a pilgrimage to Stinsford Church, the resting place of the heart of Thomas Hardy, who was born in the parish, and of other members of the family. Other points of interest are a bas-relief of St. Michael on the face of the tower, a reredos of marble and Caen stone, a font of white marble, and monumental tablets of the Pitt family.

On the outward journey a halt was made at Puddletown Church, where attention was drawn to the beautiful Norman font, shaped like a tumbler and finely ornamented with vine-leaved trellis work, the magnificent roof, and the Athelhampton chapel, its altar-tombs, its brasses, and the effigies of the Martin family, dating back to 1250.

In the afternoon the party was most kindly entertained at Bloxworth House by Mrs. Lane, a direct descendant of Sir John Trenchard who acquired the Manor, some 40 years after the dissolution of the monasteries, from the Savage family to whom it had been sold by Henry VIII. The Manor was originally attached to the Abbey of Cerne. The neighbouring church possesses a good Norman doorway, a perfect hour-glass, besides memorials of the Trenchard family and a manorial pew decorated with the arms of the Savages, the old lords of the manor. The pinnacled west tower contains a 14th century bell, with the words " Sancta Maria " in capitals divided by crosses. The church has been twice rebuilt, lastly in 1870.

Devizes. On July 16th some three score members set out, under the leadership of Col. Anderson, on a Museum excursion.

The proposed plan of campaign, after the usual course via Cranborne Chase to Salisbury, involved the passage of the high ground above the Plain, but eventually led to tacit opposition from the Military Forces in active operation in the district. A cautionary notice, gaily ignored, was followed, a few miles further on, by an irresistible road-barrier inscribed "Firing in Progress." A rapid strategic retirement was inevitable, and a flanking movement round the danger-zone was rewarded by a passing view of the pretty village of Shrewton. In spite of delay, there was ample time for the mid-day halt, and the bulk of the party arrived punctually at the Museum, the headquarters of the Wilts Archæological and Natural History Society. Here are stored the results of the labours of a succession of Cunningtons, from William the First, the collaborator of Sir Richard Colt Hoare, author of the History of Ancient Wiltshire, down to the present Curator, Captain B. H. Cunnington. Notable among the treasures of the museum is the famous Stourhead collection of urns, celts, cups, and the like, housed in a series of handsome cases. There is also the extensive Warrener collection of British birds, a fine geological collection with exceptionally interesting fossils, John Britton's Celtic cabinet, with models of Stonehenge and Avebury, a notable herbarium, besides a miscellaneous multitude of objects, among which the Marlborough Bucket is conspicuous. Attention was also drawn to a hollow globular flint, as big as an apple, containing, when turned up by a ploughman, sixty-five Roman gold coins, a few of which have reverted, via the Treasure Trove department, to the Museum. To all of these exhibits Mrs. Cunnington, whose lucid guidance at Woodhenge last year was so much appreciated, proved an excellent cicerone, meeting a rapid fire of questions with ready and complete information. Auxiliary guides were the Rev. E. H. Goddard and Captain Cunnington, who reserved his principal effort for a later period of the day when a visit was paid to the Castle. Permission had been secured to examine the ancient site, now dominated by an elaborate castellated modern residence. Here Captain Cunnington gave a full account of the history of the old castle, from its foundation by the Norman Bishop Roger to the stormy days of the Great Rebellion, when, after gallantly maintaining an unsuccessful siege by Waller, it was eventually captured and, by order of Cromwell, so thoroughly "slighted," that hardly a fragment of the walls remains.

Char-a-bancs trouble delayed one section of the party; others more fortunate on the return journey made a wide sweep westward through the beautiful vale of Pewsey, close under the Bratton "White Horse," the most ancient of its kind in the county and supposed to commemorate Alfred's victory at Ethandune. The adjacent camp, 750 feet above sea level, is but one of a series which mark the line of the chalk escarpment above the plain. There should be scope in this neighbourhood for future excursions of the Society.

Longford Castle. July 28th. This excursion, conducted by Dr. Hartley, proved one of the most popular of the season's fixtures. The visit of the Society in 1921 is fresh in the memory of many members and was duly chronicled in Vol. XIII. of the Proceedings, but it was good to renew acquaintance with the Castle and its wealth of treasures, collected by the first Viscount Folkestone and successive Earls of Radnor, the velvets, the tapestry, the furniture, and the vast array of old masters, of which the following description was given by Mr. St. John Burton:—

(1) Foremost, among the English Masters, must be placed the name of Sir Joshua Reynolds. He is represented by nine remarkable examples of his art.

In viewing these, one is reminded of the fact that he did not always seek inspiration by colour alone, but that he added to this the essential and best characteristics of his numerous sitters. Further, it is observed, by the pose and efficient grouping of his figures, so typical of his strong yet elegant treatment, that Reynolds was influenced by the great Italian Masters, whose works he had carefully studied early in his career.

The works hung at Longford Castle are typical of his best methods, and fortunately enough, these pictures do not show noticeably the deterioration so often to be deplored in respect of the pigments and mediums employed by Reynolds.

(2) Sir Godfrey Kneller, whose representative canvases may be placed with some confidence among his best contributions to art, was essentially the popular portrait painter of his day.

Unfortunately for art, the restrictions which appeared to rule portraiture at that time in England were of such a nature that it is hardly to be expected that a man oppressed by so much success as Sir Godfrey was, could rise superior to the limitations imposed on him by popularity. His work is generally lacking in vigour and spontaneity, although the portraits possess the quality of evenness and decorous colour, qualities indeed unlikely to cause any friction or discontent among his numerous and often Royal patrons.

Kneller's many paintings of members of the Bouverie family show well his capabilities.

(3) Thomas Gainsborough was a painter of rare delicacy, added to some strength and beauty of design. He appears to have executed the portrait of the Hon. William Henry Bouverie during 1773, and of other members of the family in fairly quick succession. These pictures demonstrate well the facility with which Gainsborough could finish sound and good work, and with how admirable a command over brush and colour he delineated the personality of his sitters.

(4) John Hoppner, a portrait painter who enjoyed considerable vogue during the latter part of the 18th century and

early in the 19th, is responsible for the picture of the Hon. Anne Duncombe, Countess of Radnor, a painting which one cannot help feeling would have been of greater merit had the artist appreciated more fully the importance of drawing faultlessly the hands and arms. Otherwise, this portrait, executed in 1796, appears to be a very good likeness, and moreover, expressive of the gentle personality of the Countess.

(5) Thomas Hudson, another Court painter (in whose studio Reynolds himself had been instructed for a short time) received in 1751 a commission to paint the portrait of Sir Jacob Bouverie, Bart., First Viscount Folkestone, in peer's Coronation robes. There is another portrait of Sir Jacob Bouverie, painted soon after the previous one.

The works of the great Italian, Dutch, Flemish, French, German and Spanish masters are admirably represented by many pictures, which in some cases are unique in their splendour of technique and tone values.

(6) The priceless charm of Holbein's " Erasmus " (whom the artist painted several times) is superior to that of the example hung in the Louvre. There exist copies of Holbein's " Erasmus," but in the Earl of Radnor's collection we see the original, and a very fine one it is. This picture is dated 1523, and the colours are as perfect as when laid on.

Another original masterpiece, hung next to that of Holbein, is the work of

(7) Quentin Matsys, an incomparable genius in more than one art. The picture includes surrounding details of exquisitely painted objects. The likeness is that of Aegidius, Town Clerk of Antwerp. This is surely Matsys' greatest and most perfect achievement. The lucidity and delightful quality introduced in such a painting is manifestly superb. A replica is at Antwerp. The original, formerly attributed to Holbein, was purchased at Dr. Mead's sale in 1754.

(8) Sir Anthony Van Dyck, or—as he is generally known—Vandyke, was admittedly a great Fleming, and after study in Italy he returned to his native city of Antwerp. His pictures show that southern influence could not eliminate earlier training in colour schemes.

His portrait of Marie de Medici, Queen of France, hung in the Long Parlour, will attract attention by reason of the strength and profound mastery of brushwork, with which the distinguished master knew so well how to invest his singularly convincing work.

The portrait of Charles I. is, again, characteristic.

(9) Peter Paul Rubens, knighted by Charles I. in 1630, completed an amazing output of large and brilliantly painted canvases, which are best seen separately. The almost endless array at the Louvre leaves a feeling of not unalloyed admiration.

A small full-length portrait, entitled "Rubens' Boy," showing the great painter's facile manner and characteristic colouring, hangs in the Long Parlour. There are, besides this very typical example of Rubens' art, a good many other works painted by him. The extensive "View of the Escurial" (by Rubens, collaborating with Peter Verhulst) was originally presented to Charles I. by the painter.

(10) That fine and robust master, Franz Hals, claims attention with two portraits of considerable value.

(11) Turning to Spain, the immortal Velasquez, and also Murillo, are represented, the former, by the original "Juan de Pareia," and the latter by a large painting, "Ruth and Naomi," in which the velvety warmth of his colour marks him as in the first rank among the greatest masters Spain has produced.

(12) Corregio, one of the greatest of the early Italian school, is represented by the fine canvas "Venus Disarming Cupid."

(13) The wonderful Venetian Tintoretto, and also that very beautiful colourist (14), Carlo Dolci, are represented.

(15) Among the many really fine landscapes, those from the hand of Claude Lorraine, of the French school, reveal the irresistible charm of his colour, in spite of his classicism; he is credited with being the first to paint the sun in the sky.

(16) The smaller landscapes, notably the examples, delightfully pellucid, by Cuyp, Ruisdael, and Jan Brueghel, aptly called "Velvet" Brueghel, are full of charm, and their preservation is wonderful.

Amongst the numerous and excellent pictures still remaining one can conclude by only mentioning the names Carracci, Dughet (Gaspard Poussin), Eeckhout, Van Goyen, Hobbema, Vigée Lebrun, Mabuse, Netscher, Mazzuoli, Nicholas Poussin, Salvator Rosa, Andrea del Sarto, Teniers, Van de Velde, Watts, Wouverman, Zuccaro—and yet there are a host of others.

A full description of the Imperial Steel Chair, with illustration, will be found in Vol. XIV.

In glorious weather the party rambled at will in the gardens and in the park, which contains magnificent specimens of forest and ornamental trees and the remarkable woods known as "The Great Yews" and "The Little Yews," the former of which covers an area of 80 acres. On the return journey a pleasant halt by the riverside at Fordingbridge rounded off a perfect day.

Buckland Rings. On July 31st about 40 members paid a visit, under the leadership of Mr. Heywood Sumner, F.S.A., the president of the Society, to Buckland Rings, Ampress Camp, and the twin disc barrows on Setley Plain.

Arrived at Buckland Rings, Mr. Sumner told the members: " This is a British camp of defence. It belongs to a class rare in Hampshire of camps surrounded by triple entrenchments. Bullsdown, near Silchester, and Whitsbury Castle Ditches are the only other examples in Hampshire. On Cranborne Chase there are five examples of this class, namely, Whitsbury Castle Ditches, Badbury, Hod Hill, Hambledon Hill, and Castle Ditches, near Tisbury. Buckland Rings and Bullsdown—to a lesser degree Whitsbury Castle Ditches—have a platform on the top of the middle rampart. Here the platform is about 30 feet wide, on which the defenders of the camp would have found ample space for defence.

" Without excavation we cannot say whether Buckland Rings belongs to the Iron or to the late Bronze Age. Its large (for the New Forest) size—10 acres, and the presence of 54 barrows on Beaulieu heaths, near by, suggest considerable and prolonged prehistoric habitation on the adjoining area. We wonder how this district can have supported the population that is suggested both by the camp and the barrows. It is probable that the answer lies under the Solent tides, and that at such a period of prehistoric occupation the Solent was a river valley.

" Buckland Rings stands on a bluff that marks the seaward termination of the water-parting backbone of the New Forest; there is evidence that this was a prehistoric way inland, leading to the desired country on the chalk downs."

" Ampress is a seafarers' camp, defended on two landward sides by a wide, ploughed and spread rampart with a very wide ditch, and on the other two sides by steep scarps of about 10 to 12 feet in height. These scarps were apparently wrought by the action of the tides, as the water ran up the Lymington river valley on the east side and up the Passford brook valley on the north side. There is no entrance in the landward ramparts. Who the intrusive seafarers were we do not know; but the large and unusual cluster of ' ton ' place names round Lymington, indicate either Jutish or Saxon settlements, while the Norse place names—Askin and Rossen gutters and Colgrimesmore are suggestive. Danish invaders may also be included among the possible intrusive seafarers who occupied this camp in the dark period subsequent to the Roman evacuation of Britain, A.D. 410."

A couple of miles from Ampress Camp, the party reached Setley Plain. From the road the members walked above half a mile to where they came to a couple of barrows, about which their leader spoke as follows:—" These twin barrows have the very unusual distinction of being united by the intersection of their encircling banks. This type is comparatively rare in Hampshire, but many fine examples will be found on Cranborne Chase and on Salisbury Plain. They are of a somewhat different type to these on Setley Plain, being about 240 feet over all, compared with 140 feet here, and having quite small tumps—one, two or three—within the large flat area encircled by bank and inside ditch. On the other hand, here we have—or had before Richard Warner's misdoings—big, eminent barrow mounds in the centres of the areas. Cremated remains were found in both barrows, and nothing else. Dr. Thurman, of Devizes, analysed the results of excavation in 36 disc barrows, 35 of which contained interment after cremation. In 13 of this number there were beads and other ornaments of amber, glass and jet, often in such profusion as (in his opinion) to justify the conclusion of Sir R. C. Hoare that they are the burial place of women. Disc barrows are always precise in their lay-out and in their earthwork, and are most beautiful examples of such craft. Their precision is in marked contrast to secular earthworks of the same period. This type of barrow is considered to belong to the Bronze Age period."

Corfe River. The Corfe area is a frequent hunting ground for botanists; but there was some novelty in the excursion conducted on August 2nd by Surgeon-Captain Borrett, and many specimens were secured. The party first proceeded to the Norden clay pits, from one of which the blue clay is now being extracted. After passing the Thresher's Lane light railway crossing, a snake was observed and captured by Mr. Beeching Hall. It proved to be the rare smooth snake, Coronella Laevis, two specimens of which have recently been presented by Mr. Hall to the London Zoo. In the marsh beyond were found the Western Butterwort, Pinguicula lusitanica, and masses of the Erica ciliaris. After inspecting the bridge, near by, dated 1711, known as Grimmery's Weirs, the party passed on through the Marsh meadows to Sharford Bridge, taking on the way the Hybrid Rush (a cross of the hard and soft rushes), the Reed Meadow-grass, Arrow-grass, White Beak-rush, Greater Skull-cup, and Black Mustard.

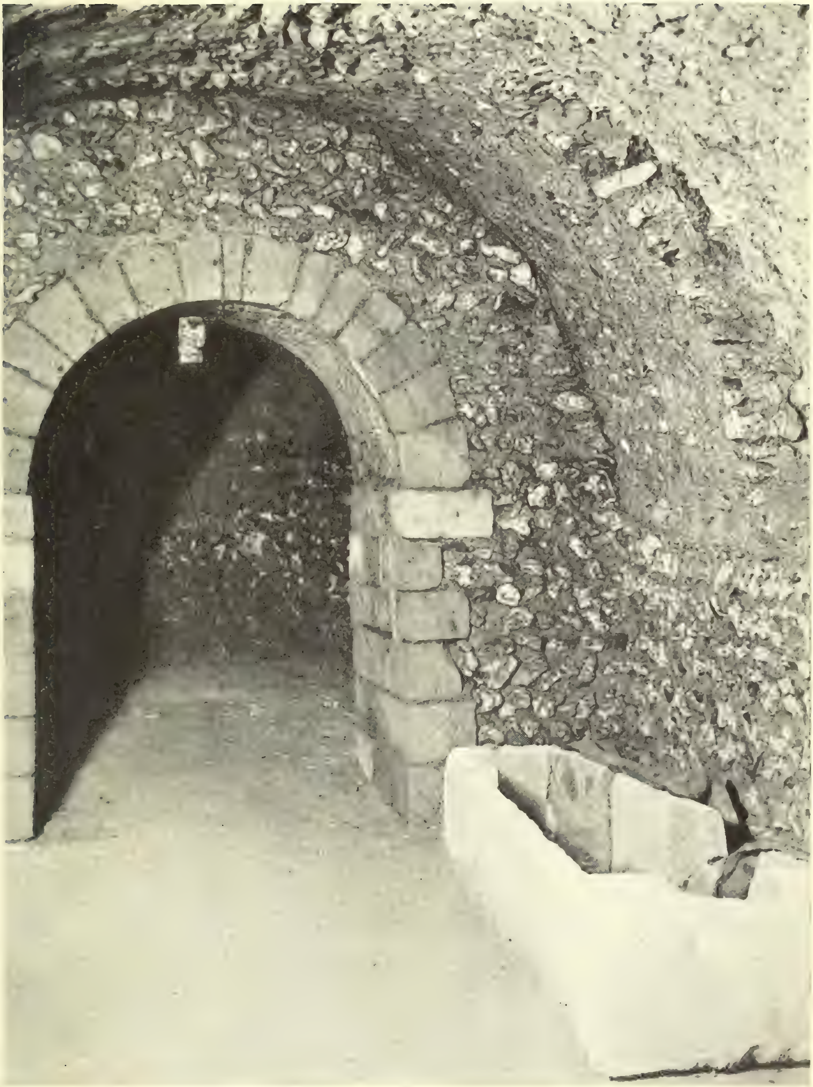
A halt was made at Sharford Bridge, some 300 years old, but some members pushed on for another mile to the Wych estuary, and return to Corfe was made across the heath-land on the western side of the river.

Chilton Candover. A recent discovery of great archæological interest was made the pretext of an excursion on August 17th, under the leadership of Col. Anderson. The route passing through Alresford, a halt was made on the margin of the Great Pond, where Mr. Cardew gave a sketch of the history of the locality, based on "An Account of Alresford," written by Sir George Brydges Rodney, who was subsequently created Baron Rodney of Rodney Stoke in the County of

Somerset, in recognition of his naval victories over the French Fleet in 1782. About the end of the twelfth century Godfrey Lucy, Bishop of Winchester, formed a noble plan for improving the trade and commerce of the city, in which that of Alresford was necessarily included, by the establishment of navigation on the river Alre or Itchen, which the Bishop undertook and completed. In order to accomplish this great design, he caused the great Ware (or Weir) to be thrown up at the head of the great pond between Old and New Alresford and, by leading many neighbouring springs and rivulets into the pond, secured a sufficient head of water to keep the rivers open to navigation by small craft through Winchester to Southampton. This enterprise was rewarded by a charter from King John conferring on "our venerable Father Godfrey, Bishop of Winchester and to every of his successors for ever" the right to levy "fines, tolls, taxes and customs" on all merchandise in transit on the river. New Alresford was laid out in its present form, with a great market-place, and became a large and important town, with a thriving trade in wool and leather. A fleeting prosperity; for the transference of the staple to Calais (1363) and Melcombe Regis led to inevitable decay, though as late as Henry VIII's reign there were four fulling mills within a mile of the town.

The Great Pond once covered an area of 200 acres and was the resort of innumerable wild birds of all sorts; but it has now shrunk to less than half its former size, and is so difficult of access that it is hardly possible to judge of its extent by glimpses through the surrounding woods.

The main purpose of the day, however, was still to be fulfilled; so after a convenient rest on the high ground near "Oliver's Battery," from which extensive views spread on all sides, the party drove on to Chilton Candover, where they were met by the Rector, the Rev. E. P. Gough, and led to the excavated site which has recently brought this secluded valley into conspicuous fame. It appears that three years ago, when the rector entered upon the living, he found that, of the mediæval church, which, after being allowed to fall into ruin, was entirely demolished in 1878, nothing was visible but a heap of débris cumbering the site and the ancient churchyard. He at once took steps to clear away the rubbish and, if it might be, to trace the foundations of the building; and, hearing from an ancient villager of some old place under the foundations into which he and other lads used to creep by means of a hole, and where they had found "bones and a great big coffin," he set to work to dig to find the hole, and was rewarded by the discovery, at a depth of some 6 feet, of the top of an arch. Long and patient excavation followed, and the ultimate result revealed itself as a complete edifice, the arch being that of a round headed western doorway 4 feet wide. It has been described as a barrel-vaulted chamber,



THE BURIED CHAPEL, CHILTON CANDOVER.

BRITISH MUSEUM
18 APR 29
NATURAL HISTORY.

with walls 5 feet thick, consisting of a nave and chancel, with apse, connected by an arch. The total length is about 20 feet, the height 9. The nave is lighted by two windows on each side, the chancel by one on each side and one at the east end. The whole building is of flint with a few fragments of roofing tile, the flints laid herring-bone fashion. The masonry is, for the most part, very finely worked with the chisel and laid with thin joints. The character of the masonry seems to place the date at about the middle of the twelfth century; but on this point there is wide diversity of opinion; some ascribing the church to Saxon times; another indicating its resemblance to Irish churches of the 10th and 11th centuries, especially to that at Glendalough; others, not lacking in boldness, suggesting a Romano-British origin, and supporting their theory by the indubitable fact of the existence of many Roman remains, villas, etc., all down the valley. It is possible that further excavations may throw fresh light upon what is at present an unsolved archæological problem.

Piddletrenthide August 23rd. It is rather remarkable that, as far as can be seen in the Society's Proceedings, no previous visit has been paid to this easily accessible and very interesting parish, with its fine 13th century church, well restored towards the end of the last century. Mr. Cardew had mapped out an intriguing route from Sturminster Newton, circling round by Buckland Newton to the spring, near Alton Pancras, which is the source of the little river Pydel, Piddle or Trent, which has contributed to the nomenclature of so many villages lying on its pleasant course. The history of the parish may be traced back to the year 1002, when Lady Emma of Normandy, by her marriage with King Ethelred, came into possession of certain royal lands in the Piddle valley, traces of which survive in the place-names Kingrove and Kingcombe. This parish, with a number of others, the Queen presented to the Benedictine monastery afterwards famous as Hyde Abbey. Of the church which stood here at the Conquest no trace remains, the oldest parts, dating from the 12th century, being the south doorway and the chancel arch. A beautiful south aisle was added in the 15th century, its arcade of richly-moulded pillars with vine-wreathed capitals being in the best perpendicular style. The great glory of the church is the stately, embattled tower, which bears over the west doorway a curious Latin inscription attributing its erection to Nicholas Locke, Vicar, a native of the village, with the date 1487 in Arabic figures.

After entertainment at the Women's Institute the party was permitted to visit the gardens of the neighbouring Manor House, containing fine timber, trim lawns and ancient fish ponds; and a short drive to Lower Waterston revealed fresh beauty in the ancient Manor, now rescued by Major Carter from its temporary degradation as a farm. It is a fine Jacobean house with some excellent Renaissance work, carefully restored after a fire in 1863; it figures as the abode of Hardy's Bathsheba Everdene. The return journey was made by way of a succession of Winterbournes.

Netley Abbey. On September 14th Mr. H. A. Richey conducted this excursion by a pleasant route through the Forest via Cadnam, returning via Brockenhurst, and reaching the Abbey soon after mid-day.

The investigation of the ruins was preceded by an address from the leader, embracing a lucid sketch of the history of the Abbey, and a picture of the monastic life of the thirteenth century. The Cistercian Order, which had been founded at the close of the eleventh century by the Benedictine monk Robert at Citeaux, found its way to England some 30 years later and spread its operations rapidly, especially in Yorkshire, as at Fountains Abbey. In the south Beaulieu was one of its early foundations, and Netley owes its origin to a mission from that centre about 1235 A.D. At the time of the Dissolution there were 100 houses of the Order in England, and Netley, as one of the Lesser Monasteries, fell an early victim to the movement, its Abbot and 12 monks, besides lay brothers, novices and servitors, being expelled and driven for refuge back to Beaulieu. The estate was granted by Henry VIII. to Sir William Paulet, afterwards Marquis of Winchester; but subsequently passed into the hands of the Earl of Hertford, who converted it into a dwelling house, where he had the honour of entertaining Queen Elizabeth, and in that state it remained till the end of the 17th century. Brickwork visible here and there dates from this transition period. It was then sold to a local builder, whose work of systematic demolition was terminated by his sudden death, but not before irreparable damage had been done; and it was only when the ruins became the property of the Chamberlayne family that steps were taken to ensure its care and preservation. At the present time it is under H.M. Office of Works. Excellent restoration work has been done and the removal of a dense growth of ivy has brought to light much beautiful detail of the architecture. It is now possible to admire the triple arcade dividing the Cloisters from the rectangular Chapter House, the deeply recessed East window of the Choir, and—the best-preserved part—the South Transept, which still retains its Eastern aisle of two bays, of which the southern one is said to have been the Lady Chapel. The whole is an excellent example of Early English style, though the west front is perhaps a little later than the rest, and the Chapter House arcade verges into the Decorated period. Practically all the outbuildings have disappeared, the Abbot's

Lodge, the Kitchens, the Misericorde, the Infirmary, even the Refectory, the Dormitories, and the Cloisters surrounding the garth 38 yards square, now known as the Fountain Court.

The Cistercian Rule was, at first, rigorous, especially as to fasting and religious exercises. Flesh, fowl and eggs were prohibited, butter and cheese only allowed when given to them as alms, and only two meals a day besides Mixtum, an indifferent kind of porridge; they slept on plank beds with straw, in their clothes "girt with their girdles"; conversation was prohibited, except in the Parlour, and then restricted to religious subjects. Discipline was enforced by acts of penance, by solitary confinement, and even by flogging. Later, with the acquisition of lands and wealth, the code became considerably relaxed, and we find this charge against them by the Archdeacon of Oxford :—"Pigs they keep, many of them, and sell bacon, perhaps not all of it; the heads, legs and feet they neither give nor sell nor throw away : what becomes of them God knows; likewise there is an account between God and them of fowle, which they keep in large quantities"; and in the XVIth century, Pope Sextus IV., bowing to the inevitable, greatly modified the rules of the Order.

The religious life centred in the Great Church and extended from Matins at midnight to Lauds at 1 a.m., Prime at 7, Mass at 8, High Mass at 10 (followed by dinner), Nones at noon, Vespers at 5 (followed by supper), Compline at 7. The Abbot's court sat in the Chapter House for disciplinary and official business, the common business of the house was transacted in the same place, and the chief working hours, besides recreation and exercise, extended from noon till 5. The domestic life of the monastery was carried on in the cloisters, in a corner of which was the Lavabo, the juniors at their studies, the seniors at their devotional reading, the novices under the instruction of a master who had complete control of their religious and ordinary education. A certain amount of manual labour was done in the garden, and various officials had charge of the services; the vestments, plate and church fabric; the food; the sick; the wardrobe; the bestowal of alms; and the care of guests.

Dewlish Oct. 2. We must go back as far as 1813 for the first discovery of elephant remains in this neighbourhood. In 1870 the species was definitely classified as Elephas meridionalis. But it was not till 1914 that systematic excavation revealed the Elephant Trench, in a steep chalk bluff overlooking the Devil's Brook, containing teeth and bones of the Pliocene age, unknown elsewhere in this district, though previously found in the Cromer Forest beds. It is commonly agreed that the formation of the trench was due to action of water, but the manner of it and of the elephant deposit still affords a problem for speculation. A lively discussion on these points took place between the leader, Mr. Bury, and a villager who took active part in the excavation. Nothing remains to mark the site, now filled-in and overgrown.

On the out-journey a halt was made near Bere Regis, where Mr. Bury explained, with the help of diagrams, how the folding of the strata in Miocene times had led to the preservation of the Eocene sands in the syncline of the Great Heath, the bare chalk to the north and south being exposed by anticlinal denudation.

Later in the day an examination was made of Culpepper's Dish, the largest of the "swallow-holes," hundreds in number, with which the heath is pitted, and of a neighbouring gravel pit offering a clear exposure of the "plateau-gravel," known, by the palæolithic implements found in it, to be of the Pleistocene age.

Report of the Delegate of the Bournemouth Natural Science Society to the Meeting of the British Association at Glasgow, September, 1928

Over 3,000 members attended this most successful meeting, but all were comfortably housed in the University building, capacious enough to accommodate all the Sections.

I attended the customary Meetings of Delegates, both presided over by Dr. Vaughan Cornish, B.Sc. In his opening address on "The Preservation of Scenic Beauty in Town and Country," he enlarged on our glorious heritage in scenery, the beauty of our ancient towns and villages, of wild waste places, and of the splendid setting of the sea, and deplored the haphazard building which now too often tends to disfigure the countryside. He had a word of commendation for the American plan of unfenced gardens. He deprecated restriction of access to mountain and cliff scenery, and suggested a Resolution to urge the Government to stimulate local authorities in the exercise of their powers to conserve the amenity of towns, suburbs, and country. Destruction of wild flowers and plants was severely condemned by following speakers, and the Resolution was carried.

At the second meeting of delegates the same subject was treated by Mr. Ewart James in an interesting address on Regional Planning, with special reference to the Lake District, which is threatened by uncontrolled "development" in the form of unsightly erections and ribbon roads. He urged a systematic survey of the region, the preservation of its beauty being a matter of national concern.

CLAUDE LYON.

Archaeological Note.

Ancient British Cemetery at Pokesdown.

In last year's "Proceedings" attention was drawn to the discovery of Cinerary Urns on former allotment land. The investigation of the site was ultimately undertaken by Dr. R. C. C. Clay, F.S.A., on behalf of the Society of Antiquaries, and on January 17th he gave the Society the result of his work, in the form of a Lecture, of which the following is an abstract.

The cremations and funeral urns were in no formal order; sometimes they were in clumps, sometimes isolated, the general direction of the field being in a straggling line following the edge of the plateau. During the war this ground was used as allotments, with the consequence that owing to the digging the urns had lost their rims, or, in cases of inverted burial, their bases; none were intact. In other cemeteries explored by Dr. Clay the urns were lidded by a stone which marked their position. At Pokesdown this practice had not been followed; nothing was placed to mark where a burial had been; indeed, in more than one case an urn was found planted upon one interred previously. Altogether 45 burials were discovered, of which some 15 were in urns. Unfortunately, throughout the excavations hardly anything was found in the way of ornaments, weapons, or human bones; with the folk of that date, i.e., the late Bronze and Iron Age, it was not the custom, as it was with the Egyptians, to bury their belongings. Flint implements, arrow-heads, scrapers, etc., were picked up, also a bronze spear-head. This weapon helps to date the cemetery; in addition, the shaft, though entirely gone, was traceable—it had been broken in the middle—by means of the hole where it had once lain.

About the middle of the cemetery two ancient pathways were unearthed; one ran about North and South, the other, crossing it, pointed for Iford, where then probably a ford existed, as it did later. These tracks were older than the cemetery, because urn burials were found in the soil above the bottom of one of them; they had apparently been used as convenient places on which to make the funeral pyres.

A few pieces of pottery were discovered, some Romano-British, one of the Early Iron Age.

The urns, restored with great skill and patience, are now in the British Museum. They are of the Deverel-Wimbury type, and were evidently the product of invaders who landed on the South Coast between Weymouth and Christchurch in the period which saw the fullest development of the Bronze Age and the dawn of the succeeding Early Iron Age.

Report of the Botanical Section.

The botanical section held 35 meetings, comprising 5 lectures at 3 p.m., 6 informal meetings at 4.30 p.m., one " At Home " and 23 excursions. The lectures and informal meetings were very interesting and well attended. The excursions, aided by the particularly fine weather, were well planned by the respective leaders, and were much enjoyed.

Among the more interesting of the plants observed on the rambles were the following :—

Papaver Lecoqii *Lam.* Hesperis matronalis *L.*
Cerastium arvense *L.* Epilobium roseum *Schreb.*
Anchusa officinalis *L.* Datura Stramonium *L.*
Chenopodium hybridum *L.* Polygonum Bistorta *L.*
Malaxis paludosa *Sw.* Ophrys sphegodes *Mill.*
O. muscifera *Huds.* Eleocharis uniglumis *Schult.*
Carex limosa *L.* Agrostis tenuis *Sib.* var. aristata *Parn.*
Deschampsia setacea *Richt.* Briza maxima *L.* B.minor *L.*

Botanical Note.

The Sea Rush: Juncus Maritimus.

A New Variety.

By L. Beeching Hall, F.L.S.

In the summer of 1927 I found growing on Studland Heath, Dorset, five large clumps of the Sea Rush, Juncus maritimus *Lam.* in which all the flowers, instead of being in the usual open panicle, were densely crowded together, forming compact rounded heads. Their unusual appearance made them conspicuous among the normal plants with which they grew. I revisited the place several times during 1928 and found that all the five clumps bore only the compact flower heads as in the previous year. On October 2nd the heads contained ripe capsules with seed, but barren flowers were more numerous than in the normal plants of the district. The average size of the heads at this date was between twenty and forty millimetres in diameter.

I have searched at Kew and South Kensington, but have been unable to find any specimens or descriptions agreeing with this plant. I am sending an account of it to the Journal of Botany as a new variety under the name Juncus maritimus *Lam.* nov. var. congestus.

Specimens have been placed in the Bournemouth Natural Science Society's collection, and sent to the herbaria at Kew and South Kensington.

Plant Notes : 1928.

By L. Beeching Hall, F.L.S.

LYCHNIS DIOICA *Mill.* The Red Campion.

As the name indicates, this species is diœcious, all the flowers on normal plants bearing either stamens or pistils, but not both. Very rarely, however, hermaphrodite specimens are found.

Like many other plants of the order Caryophyllaceae, it is liable to be attacked by a minute fungus, Ustilago violacea, and when this occurs the flowers become hermaphrodite, both stamens and pistils being produced, but the anthers, instead of bearing pollen, are filled with the violet spores of the fungus.

Colonies of plants so attacked have been found this year near Corfe Castle and at East Lulworth. Further records of its occurrence in the district are wanted.

DROSERA ANGLICA *Huds.* The Long Leaved Sundew.

This plant is rare within the twelve mile radius of Bournemouth. During the last few years, owing chiefly to drainage, there has been a decided decrease in numbers, and there has been a fear that it would become extinct within the radius on the Dorset side. This summer, however, I have found in this area a colony not hitherto noticed, which contained a large number of well grown plants. Over fifty were counted bearing ripe capsules. It may therefore still be regarded as well established.

SOORZONERA HUMILIS *L.*

Until last year the only known station for this plant was at one place in Dorset, but in May 1927 Captain Borrett found a considerable colony in a new locality, also in Dorset, but some miles away from the original place. This year we have again visited the locality on several occasions. The plants are evidently well established in competition with native species. The discovery confirms the view that this plant is native in Britain.

ERICA TETRALIX *L.* VAR FISSA *Dr.*

This variety of the Cross-leaved Heath, in which the corolla is split to the base into numerous segments, was first described and named by Dr. Druce from a specimen found on Ben McDhui, in 1913,

In 1925 I found it on Studland Heath, and Dr. Druce wrote to say that this was the first record he had received for the south of England. Since then I have seen it in several other places on Studland Heath and in the Bourne Valley in Dorset, and near Christchurch and Hinton Admiral in Hampshire, making a total of eight records in the Bournemouth district.

From Studland Heath part of one of the plants bearing the split corollas was planted in my garden. All the subsequent flowers on this root have had the usual entire corollas, proving that the splitting of the corolla is an abnormal condition which is not constant even on the same plant.

Hitherto the cause has not been determined, but the general appearance suggests the attack of a mite.

ERICA CINEREA *L.* VAR RENDLEI *L.B.H.*

This is a variety of the Bell Heather in which the flowers are replaced by little compact oval heads of crimson bracts. It is named after Dr. A. B. Rendle, F.R.S., who first described it in the Journal of Botany for 1909. During the last few summers, Captain Borrett and I have found various isolated specimens of this interesting form in the Bournemouth district, all of which we are keeping under observation.

All records of its occurrence are wanted.

(See Journal of Botany, 1909, p. 437 and Sep. 1928, p. 272).

ILLECEBRUM VERTICILLATUM *L.*

In 1925 this rare plant was growing in great abundance in one of the enclosures of the New Forest, in a plantation of young Spruce trees, where the ground between the trees had evidently been cleared recently. The plant had previously been seen in the vicinity in small quantities. In 1926 the number and size of the plants were much reduced. In 1927 there remained only about one tenth of the quantity found in 1925, and this year (1928) we had difficulty in finding a very few undersized plants. Their place had been taken chiefly by grasses, principally Agrostis alba.

The plant still persists in small quantities in several places near the plantation.

Seeds from these were sown in my garden on uncultivated ground consisting of almost pure sand under partial shade of pine trees. In the following year these produced a carpet of vivid green, and the individual plants formed dense circular mats, the largest of which attained the remarkable size of thirty-three inches in diameter. The usual length of the trailing branches of this plant is from four to six inches.

From the above it seems evident that the remarkable local and temporary abundance of this plant was due to its capacity for very quickly covering cleared ground, but it appears unable to maintain its hold in competition with other plants.

JUNCUS EFFUSUS *L.* x. INFLEXUS. *L.* (DIFFUSUS *Hoppe.*)

This is an interesting hybrid between the Soft Rush (Juncus effusus) and the Hard Rush (J. inflexus). During the last few years I have found it in various hitherto unrecorded localities in the district. It is doubtless usually overlooked owing to its resemblance to J. inflexus, from which it may be distinguished by its continuous pith and by the stem having numerous fine longitudinal lines but no furrows except when dry. Inflexus has the pith broken up into numerous transverse partitions, and the stems with distinct furrows. From effusus it may be separated by the darker and much more shining sheaths at the base of the stem, and by its thinner and more wiry stems.

ISOETES ECHINOSPORA *Dur.*

The discovery of this plant in Dorset is perhaps the most interesting botanical event in 1928.

Although previously known in Scotland, Wales and Ireland, this is apparently the first record of its appearance in England.

There is good reason to believe that it has only recently become established in Dorset, probably having been carried by wading birds.

It has been confused with Isoetes lacustris, *L.* from which it is distinguished by having the tubercles on the macrospores much longer and more acute, and by the leaves being of a paler green and spreading instead of erect.

Report of the Entomological Section.

Five informal meetings were held during the winter session at which short papers were read on various subjects of entomological interest, followed by discussions in which most of the members of the section took part. By the kindness of Mr. F. B. Taylor and other members of the Microscopical Section many most interesting subjects were studied with the help of the microscopes.

By arrangement with the Botanical Section the Entomologists joined them on all the summer excursions, which were favoured as a rule with glorious weather.

Nineteen hundred and twenty-eight will be remembered as a "Clouded Yellow" year. Colias edusa was noticed on the south coast in the spring and was seen in the Bournemouth district every month from June to October, being quite common in September on the golf links, in the public gardens, and even in the streets. Several specimens of the light coloured variety (var. helice) were also seen. The Comma butterfly (Polygonia c-album), although reported on several occasions, was not as plentiful as it was last year. The Painted Lady, Pyrameis cardui, was quite common both early and late in the season. Two insects that are both exceedingly rare in the British islands have been taken in the district, namely, the Camberwell Beauty, (Vanessa antiopa) and the Pine Hawkmoth (Hyloicus pinastri), the latter almost in the centre of the town.

Report of the Zoological Section.

Mammals.

For some weeks a Roedeer frequented Puck's Hollow in Talbot Woods.

Birds.

A White Wagtail, a male in good plumage, was seen on April 18th on the river bank at Wareham.

A fine Blackcock was reported from the heath above Wareham by a man who, as a boy, knew the birds well when they were by no means uncommon in West Hampshire and East Dorset.

There is a gradual diminution both in number of species and of individuals of some of the more interesting birds. A pair of Crossbills nested and brought off their young within the town boundary and others nested as near as Canford.

Dartford Warblers nested within our area, and at least one nest was hatched off.

From 1915 to 1920 (or thereabouts) the Lesser Redpoll nested in some numbers scattered all over the town; for the past two or three years I have not heard of a single nest in our area. Somewhat later than 1920 small colonies of Woodlarks established themselves in Talbot Woods and elsewhere; during this season I have not had a single nest reported to me.

The following notes are contributed by Rev. F. C. R. Jourdain :—

HANTS.

Little Gull (*Larus minutus*). One in winter plumage, Hengistbury Head, 22nd February, 1928. *Br. B.* xxi. p.286.

Peregrine Falcon (*Falco p. peregrinus*). One seen to strike and kill Kestrel in N. Hants near the Berks border (D. A. Phillips). *Br. B.* xxi. p.303.
One pair attempted to breed on an open heath in South Hampshire near a small pine tree in the spring of 1928. Two

eggs were laid, but the nest was deserted on account of being disturbed. No instance of breeding on level ground on the mainland of England has been previously reported though it has been known to breed on a low islet at sea off the Welsh coast. Breeding on the ground has, however, been reported from Finnish Lapland.

Grey Phalarope (*Phalaropus fulicarius*). One was picked up dead on a heath near Ringwood in February, 1928, but was too far gone to be worth preserving. One seen close inshore at Hengistbury Head by Miss C. Popham on October 28th, 1928.

Wigeon (*Anas penelope*). Several males in full plumage on Littlesea with Mallard on 19th June, 1928.

Rock Pipit (*Anthus s. petrosus*). A hen seen building on February 12th, 1928, at Shanklin, I. of W.

Robin (*Erithacus r. melophilus*). One with pure white tail and white primaries in garden near Tuckton Road, October 3rd, 1928.

Crossbill (*Loxia c. curvirostra*). Three birds (one red) seen at Southbourne 26th September, 1928.

DORSET.

Crossbill (*Loxia c. curvirostra*). Nest with 3 eggs recorded in Br. B. xxii. p.61, as found on 22nd April, 1928, in E. Dorset, near the Hants border. The first definite record for the county. See B.B. for further details.

C. Palmer records a nest of Nightingale (*Luscinia m. megarhyncha*) with 4 eggs at Sherborne on 6th May, 1928 (Br. B. xxii. p.42), a remarkably early date.

Woodchat (*Lanius s. senator*). An adult female shot at Portland on 23rd June, 1928, and sent to me by Mr. Blinn. See Br. B. xxii. p.61.

It is proposed, for the future, to keep, and to publish in our Proceedings, observations of the Fauna of the district each season. Will members please help by reporting to the Chairman whatever they consider worthy of record?

Zoological Note.

The Black Adder.

By L. Beeching Hall, F.L.S.

The black adder or viper has long been known, and specimens have occasionally been reported from various parts of Europe and the British Isles.

Linneus regarded it as a distinct species and named it Vipera prester, but it is now known to be a variety of the common adder, Vipera berus. On one occasion a black female adder gave birth to seventeen young, only one of which was black, the remainder being of normal colour.

Adders vary very considerably with regard to their depth of colouring. Very dark brown specimens, in which the markings are very obscure, are not uncommon, and these have sometimes been reported as black, but the true black adder, as shown in the photograph, is uniformly black, with a glossy surface, showing a bluish sheen in the sunlight. There is no trace of markings on the upper side. The under side is slightly paler in shade.

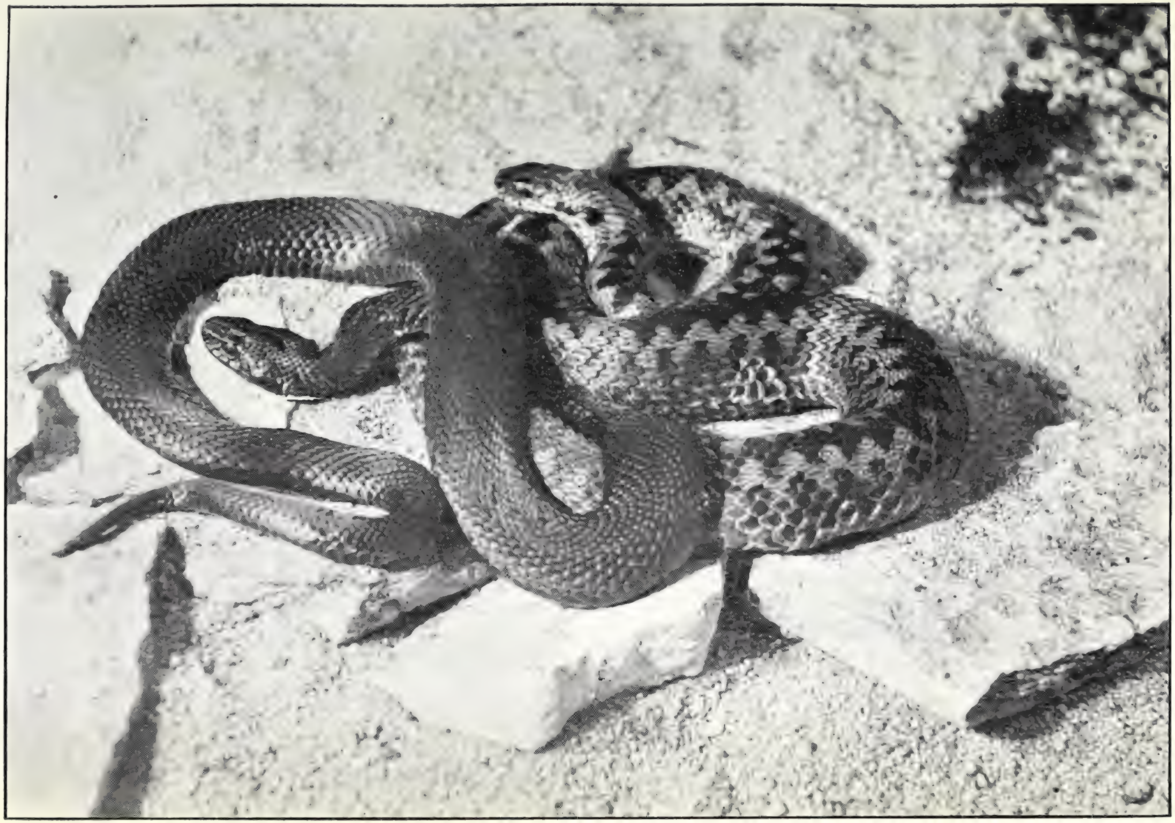
The photograph shows a black adder taken in the New Forest and a normal specimen found near Corfe Castle. Both were caught in 1926 and kept alive under observation, in as natural conditions as possible, for several months.

Most people still have an unreasoning prejudice against all reptiles, particularly snakes, despite the fact that the majority are harmless, and they are not usually credited with intelligence, but on close acquaintance they show a decided variation in temperament among individuals of the same species.

Of the two snakes shown in the photograph, the normal adder was decidedly aggressive and always ready to strike, while the black specimen was easily alarmed and could never be induced to use its fangs.

Library Report.

The Library continues to show a healthy growth in the number of its volumes, and that an increasing interest is taken in the Library is proved by the number of books borrowed. A rough estimate shows that well over 200 volumes were taken out last year, which is a satisfactory increase on the preceding year.



THE BLACK ADDER.

Photo, L. B Hall.

BRITISH
MUSEUM

18 APR 29

NATURAL
HISTORY.

A number of useful " Reports " and " Proceedings " have been received from other Societies in exchange for the last volume of our Proceedings. As evidence of the growing importance of our Society it is worth recording that offers to exchange Proceedings have been received from various parts of the world, from China in the Far East to Chicago in the West. It is hoped soon to effect an exchange with some of the Scientific Societies overseas.

The Hon. Librarian gratefully records the receipt of books from the following members; and in doing so he wishes to express the thanks of the Society to the donors :—

Mr. Henry Backhouse.
Surgeon-Capt. G. G. Borrett.
Mr. E. St. John Burton.
Mr. Henry Bury.
Mr. F. W. French.
Dr. J. B. Hurry.
Dr. F. G. Penrose.
Mr. R. Vowell Sherring.
Mr. F. B. Taylor.
Mr. A. W. Waters.
Mrs. Linton.

The following works were purchased :—

Ancient Stone Implements of Great Britain, by Sir John Evans, F.R.S.
Animal Biology, by J. B. Haldane and J. Huxley.
Biological Chemistry and Physics of Sea Water, by Mr. H. W. Harvey, M.A.
Chambers' Twentieth Century Dictionary.

and further numbers of the following Periodicals :—

Antiquity.
Bird Lore.
The British Museum Quarterly.
The Journal of Botany.
Nature.

Museum Report.

We have received a handsome gift of 50 cases of stuffed birds, duplicates from the Salisbury Museum, from Mr. F. Stevens, the Curator .

Presidential Address.

SATURDAY, DECEMBER 1st, 1928

Some Notable Inventions and Discoveries.

By Claude Lyon.

The first and perhaps the most wonderful discovery made by man, in his slow progress from savagery to civilisation was the discovery of the use of fire, and of the means by which it could be produced. No ape or ape-like creature used fire, so far as we can tell, and this, as it seems to me, is one of the ways in which man shows his immense superiority over his distant cousin the anthropoid ape. We have no idea when this wonderful discovery was made; but there is evidence that the men of the quaternary period had learnt the use of fire, as fragments of charcoal have been found in cave deposits of that age.

In the very earliest times man must have used for his defence such primitive weapons as the sticks and stones which lay to his hand. But one day some unknown genius invented the bow and arrow, and man's position in the world was at once immensely improved. It is thought that originally man was wholly carnivorous, and so depended entirely upon the chase for his food. But in course of time he changed his mode of living and became in part granivorous. What was the reason of the change? It was probably owing to an increasing difficulty in obtaining his favourite food. Mr. Harold Peake, in his interesting little book on *The Origins of Agriculture*, suggests that it was the women who first introduced " the vegetarian elements into the primitive bill of fare." They may have experimented with the nuts and berries which they found growing in the neighbourhood; and finding them good to eat, persuaded their men-folk, when they returned hungry from an unsuccessful hunt, to try the new food. The woman tempted the man, and he did eat.

And, presently, when nuts and berries failed and hunger pressed, the women may again have come to the rescue by collecting the seeds of certain grasses, grinding them into a coarse flour, and baking a kind of bread on heated stones; something like the chupatties made in India to-day. The late Mr. Grant Allen suggested that grains from wild plants used as food were scattered as offerings on the grave of a departed friend. These sprouted and in time produced fresh seeds and so gave to mankind their first idea of cultivation. I quote from Mr. Peake's book. But it seems to me that a simpler explanation is to be found in imagining that cultivation arose from the observation of someone that the seeds of plants growing in the open germinated, and, presently, grew into plants of the same kind, which, in due course, produced the same sort of seed. Collecting the seed it was scattered in some open space near the homestead, and thus cultivation began. The question which seeds were first sown is an interesting one, but it does not concern us now.

The agriculturalist needed implements with which to prepare the soil, and so some kind of hoe was made. This would seem to be the simplest kind of tool that could be fashioned. Then at some subsequent period, perhaps centuries later, the plough was invented. This, indeed, was a wonderful invention. We think little of the plough nowadays: it seems such a simple sort of contrivance for turning up the soil; but its invention was really of very great importance in the history of the human race. As the years passed, other things besides cereals would be grown, plants from which fibres could be obtained, plants which produced fruits. Vines, for instance, have been cultivated for a very long time; and, probably by chance, it was discovered that the fermented juice of the grape formed a pleasant, if intoxicating, drink. There are pictures in the ancient Egyptian tombs showing the making of wine. Beer also was known to the Egyptians. And there are pictures showing that they indulged occasionally—we must hope only occasionally—in these delectable beverages to excess.

The domestication of cattle was another step on the ladder of progress, and a very important one. We do not know whether it was antecedent or subsequent to the discovery of the cultivation of the soil. It is easy to imagine how it originated. Some young animals were captured at a time when they were not needed for food. They became tame and some tender-hearted person decided to keep them. They bred and their progeny became tamer still, and so in time a breed of domesticated animals arose. The majority of these were doubtless used for food, but some would be used as beasts of burden.

The precious metals have been known for many centuries. Wonderfully made articles of jewellery have been found which date back to prehistoric times. Gold seems to have been more abundant than silver. Copper was presumably not known until long after gold and silver were being used. Later still we must suppose that someone discovered that by adding something to copper a harder metal was produced. The something of course was tin, and the discovery initiated the age of bronze. The iron age succeeded that of bronze. But the discovery of iron takes us back to a very early period. The Assyrians and the Egyptians certainly used iron, and we know that it is referred to in the Bible (Genesis IV,22) where we read that Tubal-cain was an instructor of the artificers in brass and iron.

The invention of pottery is of great antiquity. "The primitive races of mankind," we are told in the Encyclopædia Britannica, " took perforce such clay as they found on the surface of the ground or by some river-bed, and with the rudimentary preparation of spreading it out on a stone slab . . . or treading it with the feet to render it fairly uniform in consistency, proceeded to fashion it into such shapes as need or fancy dictated. . . ." And presently some unknown genius invented the potter's wheel, a simple but none the less wonderful contrivance. At first the pots and pans were merely dried in the sun; but after awhile they were baked in some kind of primitive oven, a further discovery of considerable importance in the progress of mankind.

A writer in a recent number of the *Scientific American* asks: "Off hand what would you say is man's greatest invention? It dates back 5,000 years; it is the wheel. Wheels compose a part of practically every vehicle and there is practically no kind of machinery that does not use them." In the recent excavations at Kish in Mesopotamia two wheels belonging to a small chariot and four to a larger chariot were discovered. These date back, as stated in the *Scientific American,* some 5,000 years; but wheels were probably in use long before that time.

The next great prehistoric invention to which I would refer is the spindle. The spindle is the simplest of implements, just a smooth short stick with a small hook at one end and a weight at the other end or in the middle. With but slight improvement it is in use to-day in various parts of the world. It might be thought that weaving must have come after spinning, but it is possible that a rude material, something like a mat, may have been made of reeds and grasses. The ancient Egyptians were wonderfully expert weavers, as some of their linen cloths used as wrappings for the mummies clearly show.

When man took to cultivating the soil he had to give up his nomadic life. He settled on the plot of ground he had brought into cultivation: others settled near him and so in time villages came into existence. Among the members of the community some would begin to take an interest in natural phenomena. The rising and setting of the sun would be a constant surprise. Was it the same sun that rose every morning or was it a new one? Why did it always pursue the same path? Why did it give off light and heat? And what were those beautiful twinkling stars which dotted the heavens after the sun had disappeared? One can well believe that some with vivid imaginations would enunciate all sorts of strange theories. They would pretend to a knowledge which they did not possess, and would put themselves forward as interpreters of the mysteries of nature. They traced fanciful figures in the groupings of the stars: one was said to be a lion, another a bull, and so on. Thus the constellations came to be named, and astronomy, which means " star arranging," one of the oldest and the most fascinating of the sciences, came into being.

I come now to an invention of great importance. The Assyrians and the Egyptians believed writing to have been of divine origin. According to the Assyrians the art was revealed to one of their early kings: according to the Egyptians it was brought from heaven by the ibis-headed god Tehuti or Thoth, and taught by him to the priests. The Chinese, however, believed that it was the invention of an ancient sage, who conceived the idea from noticing the weird marks made on wet sand and mud by the footprints of birds and beasts. Several ancient scripts have come down to us: we cannot say whether they originated from a single earlier one, all traces of which have been lost, or whether each was invented at a different time in a different place. The very peculiar writing of the Assyrians has been called cuneiform from the Latin *cuneus* which means wedge. It is only comparatively recently that it has been deciphered. As there was hardly anything to give a clue to the meaning of the characters, their decipherment, which was the work for many years of several philologists of different countries, was a really wonderful accomplishment. The Egyptians wrote in hieroglyphs, each being a little picture of the object to be recorded, but it must soon have become evident to the scribes that they needed an alphabet as well. No mere picture could record a person's name or express a concrete idea. So the curious plan was evolved of making certain hieroglyphs serve the double purpose of depicting the object drawn and also serving as an alphabetical character. For instance; the drawing of a leg and foot represented a leg and foot, but stood for the letter which we call b as well: a wavy line represented water and also the letter n.

Chinese writing is ideographic pure and simple; and its study involves an immense labour. Many a Chinese student to-day must wish for a reformer to arrive, to do for his script what Kemal Pasha is doing for the Turks. If the Chinese characters are supposed to represent the objects they stand for, then one needs a powerful imagination to trace the likeness. Sanskrit, the script of ancient India, is still in use. We do not know where it originated or when.

I pass on to geographical discovery. One of the earliest expeditions of which we have any record was that sent by Queen Hatshepsu or Makere, an XVIII dynasty Egyptian sovereign, who reigned about 1,500 B.C. (the date is uncertain), to the Land of Punt. This is thought to be Somali-land. The expedition is graphically recorded on a wall of the temple built by the queen and now called Der el Bahri.

The early geographers imagined the earth to be a flat disc surrounded by a limitless ocean. Pythagoras, who lived in the

VI century B.C., seems to have been the first to form a true conception of its shape. So, too, did Aristotle who lived some 200 years later. The Phœnicians were explorers as well as traders, and it is thought that they even managed to circumnavigate Africa. There was water communication between the Mediterranean and the Red Sea by a canal which connected the Nile with the Red Sea. This canal was begun by the Egyptian king, Necho, about 600 B.C. and finished by Darius, the Persian, about a century later. The present Freshwater canal, excavated by the Suez Canal Company, follows for a part of its course this old canal, both traversing the fertile region called by the ancient Egyptians Gosem and referred to in the Bible as the Land of Goshen. Strabo, born about 60 B.C., was a great traveller and recorded the results of his observations in several books on Geography. Ptolemy, of Alexandria, who lived in the second century of our era, seems to have been regarded by his contemporaries as a kind of universal genius. But he was a compiler from the works of others rather than an originator of new ideas. He wrote a sort of text-book of Geography, but is best known for his *magnum opus,* the Compendium of Astronomy. It is strange to think that the system of astronomy which he is supposed to have originated, and in which the earth is regarded as the central body round which the heavenly bodies revolve, should have been accepted as true for more than a thousand years. It was not till about 1530 that Nicolaus Copernicus, in propounding the system which bears his name, removed the earth from that proud position and put her in her proper place.

Euclid, the founder of a mathematical school about 300 B.C., was the inventor of the Elements of Geometry, which used to be such a trouble to us in our young days that we often wished he had never been born. Archimedes may be regarded as his contemporary. He, too, was a mathematician and a great inventor; but of his inventions I need only mention the screw which bears his name.

We cannot say when or where lenses were first used. As the ancient Egyptians were expert glass blowers it is quite possible that they made lenses; but we have no evidence that they did so. Speculating on the origin of lenses brings one to spectacles, one of the most useful of minor inventions. Some attribute them to Roger Bacon, and, in his work on Optics, he refers to a magnifying glass. Possibly, too, he was the inventor of the microscope. The famous Robert Hooke, who has been called the greatest of philosophical mechanics, and who ranks with the equally famous Marquis of Worcester as an inventor, is believed to have effected various improvements in the microscope. While speaking of the microscope I ought to mention Anthony van Leeuwenhoek, who has been called the Prince of Microscopists. Hooke died in 1703 and Leeuwenhoek about twenty years later. It was another Dutchman who invented the telescope. There were three or four claimants to having invented it, but, I think, it is now generally conceded that the claim of Hans Lippershey, a spectacle maker of Middelburg in Holland, is justified. The discovery of the principle of the telescope seems to have been made by accident and the traditional account of the discovery, as given in the Encyclopædia Britannica, is that " Lippershey, happening one day, whilst holding a spectacle-lens in either hand, to direct them towards the steeple of a neighbouring church, was astonished on looking through the nearer lens to find that the weathercock appeared nearer and more distinct." He put the lenses into a tube and thus the first telescope came into being. That was in 1608, and the telescope was of the kind that is now called a refractor. The reflecting telescope was invented by Sir Isaac Newton about 1666. It may be as well to remind you that the largest refractor yet made is the Yerkes telescope which has a tube 70ft. in length and an object glass 40in. in diameter. It is at the Yerkes Observatory at Williams Bay on Lake Geneva, Wisconsin, U.S. The largest reflector is the Hooker which has a mirror 100in. in diameter. It is rumoured that American astronomers are now " out " to construct a still larger reflector which is to have a mirror 200in. in diameter. What further wonders of the universe will this giant telescope reveal to the astronomical world?

As a measurer of time the sun-dial seems to have been used by the ancient Egyptians and the Babylonians, and we read in the Bible of the sun-dial of Ahaz. When the sun did not shine this means of measuring time could not be used, so an instrument called the clepsydra was invented. The name may be interpreted as the " stealer of water." It dates back to the Babylonians, and was used by the Greeks and the Romans. Clocks are first mentioned in the XII century and watches towards the end of the XIV century. The earliest watches were called Nuremberg eggs, as they were invented in that city. They were clumsy things, too large and too heavy to be conveniently carried in the pocket, so they were suspended from the girdle. Nuremberg at that time was at the height of its glory and was one of the wealthiest cities in Europe. Here, too, wire is said to have been first made. One can well imagine that those old eggs were not remarkable as timekeepers, and it was to an Englishman that we owe the great improvement that was subsequently made in watches. Early in the XVIII century the British Government offered a large reward for a watch that would run so accurately that it could be used to determine the longitude at sea. John Harrison, who was born near Pontefract in Yorkshire, in 1693, set to work as a young man to produce such a watch. He made several watches, each, it is said, an improvement on the last, and, finally, he made a watch, or rather a chronometer, that gained the reward. After a long voyage to the West Indies, during which it was subjected to various changes of temperature, it was found, when examined on its return to England, to have varied less than two minutes.

The mariner's compass is one of the instruments whose invention is ascribed to the Chinese, but the Italians claim that it was invented by Flavio Gioja, a native of Amalfi, about 1302, and they have erected a statue to him in his native town. An Englishman, on his return to this country from the Crusade led by Richard Coeur de Lion, is said to have brought back a description of a needle which pointed to the North. Lord Kelvin, during the course of his wonderful career, turned his attention to the compass and so greatly improved it that it was almost like a new instrument. A machine, called the gyro-compass, has been invented in which a heavy wheel mounted in a ring and rotated at very high speed may supersede the compass. Two instruments in every day use are the thermometer and the barometer. Both were invented in the early part of the XVII century, the former by Galileo and the latter by his pupil Torricelli. Galileo was a Professor of Mathematics at Padua where William Harvey, who discovered the circulation of the blood, was a student. Harvey announced his discovery in a celebrated treatise published in 1628.

The invention of gunpowder is sometimes ascribed to Roger Bacon, who, in his work *De Mirabili Potestate Artis et Naturœ,* written about 1242, speaks of a mixture which produces a noise like thunder. But the Germans claim that Berthold Schwartz, a Franciscan monk, who lived in the XIV century was the inventor, and to set all doubt at rest, at any rate to their own satisfaction, they have erected a statue to him at Freiburg in Baden, his birthplace. For centuries gunpowder was the only explosive in use, but it has now to a great extent been superseded by other and more powerful explosives. In 1846 C. F. Schönbein, a German professor at Basle, discovered guncotton, the first of a number of high explosives of which I need only mention dynamite and cordite. The use of firearms naturally followed the invention of gunpowder. We first hear of them in the XIV century, the earliest weapon being a simple tube plugged at one end and resting on a stand. Brown Bess, a flint-lock musket, was the weapon with which our troops were armed in the wars with Napoleon. The rifle was invented many years before it came into general use. The Germans claim it as a German, and the Austrians as an Austrian, invention. Breech-loaders were introduced soon after the Crimean War, and the magazine rifle invented some fifty years ago in the U.S. was a long time in making its way in the army. Pistols, now practically superseded by revolvers, were invented, as the name implies, at Pistoia in Italy. As to big guns, it is impossible to say when they began to be used. But probably it was about the middle of the XIV century when they were tried at sea. There is in the Armoury at Malta a remarkable old gun with a copper tube surrounded by coils of tarred rope to give it strength. It is said to have been used by the Turks at the siege of Rhodes in 1522. What a difference between such a gun which fired stone balls, and, say, our at one time celebrated Woolwich Infant which weighed 80 tons, or the guns of the Queen Elizabeth, which fired shells weighing nearly a ton, or the monster Big Bertha, with which the Germans hoped, during the war, to destroy or at least seriously damage Paris.

From the consideration of these deadly machines it is a pleasure to turn to an invention that has been not only of transcendent importance in the history of the world, but has also been of immense benefit to the human race. It is said that printing from block types was known to the Chinese many centuries ago, but it does not seem to have been known in Europe until Gutenberg's time. Johannes Gutenberg was born about 1397 at Mayence. In partnership with the goldsmith, Johannes Fust, he set up the first printing press in his native town. Many other cities, however, claim to have been the first to set up a printing press. The first printed book appears to have been a Latin Bible which was printed somewhere between 1450 and 1455. Caxton set up his press at Westminster about 1470. Without paper the printing press would have been of very little use. The ancient Egyptians used a kind of paper made from the papyrus plant, which was grown extensively along the banks of the Nile, for the purpose. This papyrus paper was made by laying thin strips of the stalk of the plant side by side on a board, and laying other strips gummed across. It was made in lengths which when written or painted upon were rolled up. Some of the rolls are remarkable for their length. There is one in the British Museum, called the Harris Papyrus, which is 135 feet long and 17 inches wide. In countries where the papyrus was not obtainable, parchment, prepared from the skins of animals, was used. The name parchment is derived from Pergamum where about the middle of the 2nd century B.C. the best parchment was made. Paper, made from rags, was first made by the Chinese and for many centuries they appear to have had a monopoly in its manufacture. It was an important article of export from that country and Samarcand was the chief distributing centre. The secret of paper-making was revealed to the Arabs by some Chinese paper-makers, who had been taken prisoners. The industry was established in Sicily by the Arabs and in Spain by the Moors. Paper seems to have been first made in England during the reign of Queen Elizabeth.

The end of the XV century was a time of great importance in the history of geographical discovery. It was the time of Christopher Columbus, Vasco da Gama, and John Cabot. Columbus crossed the Atlantic several times, always hoping to find a way through to Cathay and India. On his first voyage he sailed from Palos in Andalusia on the first Friday in August, 1492, in a 100-ton vessel called the Santa Maria, accompanied by two caravels of about 50 tons each. He sighted land on Friday, the 12th of October. It was not the American continent but only a small island, probably one of the Bahamas, but he went on and discovered Cuba and Haiti. On a subsequent voyage he discovered Central and South America which he took to be the eastern part of Asia, but it is doubtful if he ever saw North America. This was first discovered authentically by John Cabot, a Venetian of Genoese extraction, who had settled at Bristol. He sailed for the West with the good wishes of Henry VII in May 1497 in a vessel called the Saint Matthew and sighted land on the 24th of June. This land he named appropriately Prima Vista (First Seen). It was probably Cape Breton. There is little doubt, however, that America had been visited years before by those hardy adventurers the Norsemen. Vasco da Gama, the Portuguese navigator, led an expedition of three vessels from Lisbon to Calicut. He sailed from Lisbon on the 8th of July, 1497, and reached Calicut on the 20th of May following.

About twenty years later Ferdinand Magellan, another Portuguese navigator, who was in the service of Charles V, set sail from San Lucar in command of a fleet of five vessels to find a way to the Spice Islands by South America. He sailed through the straits which bear his name, discovered the great ocean which he named the Pacific, and was making for home when he was killed in a fight with the natives in one of the islands of the group which we now call the Philippines. Only one of the five vessels got back, a vessel which was well named Vittoria. Of a crew of nearly 300, which left Spain, only 35 returned. This was the first vessel to circumnavigate the world. Sir Francis Drake was the first Englishman to accomplish the same voyage. He left Plymouth in December, 1578, and arrived safely home again in September, 1580. The discovery of Australia is generally attributed to the Spanish navigator, Torres, who sailed through the strait which bears his name in 1606; but the French claim that a French navigator, the Sieur de Gonville, sighted the coast about a century earlier. We owe it to the great English navigator, the bicentenary of whose birth was celebrated on the 27th of last October, Captain Cook, that Australia is to-day a part of the Empire. He hoisted the flag there in 1769. New Zealand was discovered by Abel Tasman, a Dutchman, in 1642, but it was first circumnavigated by Cook.

Let us turn now to Africa. In maps of Africa of the mid-Victorian period the whole of the centre of the continent is a blank. One of the pioneers of African exploration was that great missionary traveller, David Livingstone, who arrived in Africa in 1841 and died there in 1873. Of his many discoveries in the Dark Continent I need only mention Lake Nyasa and the Victoria Falls of the Zambesi, the grandest falls in the world.

Livingstone was lost for a time in the wilds of Africa, and some of you may remember the excitement there was in England when the proprietor of a great newspaper said to Stanley, the journalist, with true American brevity : " Go and find Livingstone!" His Majesty Stanley, as he was sometimes called from his initials H. M., went and found the missing traveller. The first white man to cross Africa was Verney Lovett Cameron, who was sent out in 1873 to succour Livingstone. On his way from Zanzibar to Ujiji, on Lake Tanganyika, he met the dead body of Livingstone being carried to the coast by his servants and he determined to go on and explore. His object was to trace the course of the Lualaba, which he rightly believed to be the same as the Congo. He was unable to follow the Lualaba but he reached the West coast on the 28th November, 1875. The discoverer of Lake Victoria, the second largest freshwater lake in the world, was John H. Speke. He and Burton (afterwards Sir Richard Burton) were sent out to Africa by the Royal Geographical Society. Burton was temporarily laid up by illness, and Speke, going on without him, was the first white man to behold that veritable inland sea on the 3rd August, 1858. Four years later, namely, on the 26th July, 1862, the same intrepid explorer discovered the falls now called the Ripon Falls at the North end of the Lake by which the Nile starts on its long course of more than 3,400 miles to the Mediterranean. And the age-long mystery of the source of that wonderful river was solved—and solved by an Englishman. What a strange fate it was that these two explorers, who had risked their life almost every day during their wanderings in Africa, should have been killed by accident after their return to England, Cameron by a fall in the hunting field and Speke by an accident out shooting. It was Stanley (afterwards Sir Henry Stanley) who was the first to trace the course of the Congo, to circumnavigate Lake Victoria, and to discover the mountain range, Ruwenzori, the highest snow-peak of which, 16,800ft., has been named after him. I have only time to refer very briefly to the two most important geographical discoveries of the present century; first the discovery of the South Pole, by Roald Amundsen, the intrepid Norwegian. Setting out from his base, which he called Framheim after his vessel the Fram, on the great Antarctic ice-barrier, with four companions on the 20th October, 1911, he reached the Pole on December the 14th. Capt. Scott, with his party of four companions, Wilson, Bowers, Capt. Oates, and Evans, also reached the Pole about a month later, on the 17th of January, only to find that they had been forestalled. The fates had been against them from the first. They had had to battle against the most terrible weather conditions, whereas the weather had signally favoured Amundsen. On the return journey they encountered blizzard after blizzard, which so delayed them that their fuel ran out and they were short of food. And then it was that Oates, of whom it has been said that he was a true English gentleman, in a fine spirit of self-sacrifice, feeling that, with his frost-bitten feet, he was a burden upon his companions, went out from the shelter during the night into the raging storm, to lose himself in the awful waste of ice and snow. His last words were : " I am just going out and may be some time." All perished, and their frozen bodies were found some months later. Amundsen, leaving Spitzbergen in the semi-rigid airship Norge with 17 companions on the 11th of May, 1926, reached the North Pole. But he, in his turn, had been forestalled, as Lieut.-Commander R. E. Byrd, of the U.S. Navy, who left Spitzbergen in an aeroplane two days earlier, reached the Pole some time before him.

Having completed my brief survey of geographical discovery, I turn to a different branch of my subject and take you back to the year 1571. On the 27th of December of that year Johann Kepler was born at Wiel der Stadt in Wurtemberg. He was both an eminent astronomer and a great mathematician; and the well-known laws which he discovered form the starting point in modern astronomy and served as the groundwork of the researches of a still greater man, Sir Isaac Newton, who saw the light just 71 years later at Woolsthorpe in Lincolnshire. Of the many inventions and discoveries made by Newton I have already referred to the reflecting telescope, and I need now only mention the binomial theorem and the spectrum of white light. It was his discovery of the solar spectrum, which, though it had no practical result at the time, was, many years later, to lead to the invention of an instrument of immense value to the astronomer and the physicist. He was the champion, if not the originator, of the emission or corpuscular theory of light, as opposed to the undulatory or wave theory which had been propounded by Huygens, the Dutch physicist. But, of course, Newton will always be best known as the discoverer of gravitation. I ought to remind you that it was a Scotchman, John Napier, of Edinburgh, who invented, many years before Newton's time, what he described as a means of facilitating calculations, called logarithms. This he explained in a small book in Latin published in 1614.

And now for a few references to discoveries in connection with chemistry. If it is true that the word chemistry is derived from the ancient Egyptian term chem, which was the name of their country and means black, it follows that chemistry was originally looked upon as a black science. At a later period, however, it was regarded as a sacred mystery whose secrets were to be carefully guarded by the initiated. The alchemists were the forerunners of the chemists of to-day. The desire of the alchemists in their life-long researches was to discover the philosopher's stone and the elixir of life. Chemistry, as such, probably dates from the XVII century. With Robert Boyle, who wrote a book entitled *The Sceptical Chemist* in 1661, we have the turning point in the history of the science. The world was changing and there was abroad an eager spirit of inquiry. Boyle was an assiduous student of science and practically devoted his life to its pursuit. He was one of a small group of learned men who formed what was called the Invisible College, whose members met at each other's houses to discuss philosophy and science. This Invisible College became afterwards, I believe, the Royal Society. The learned Dutchman, Hermann Boerhaave, who was considered the cleverest chemist and physician of his day, wrote a work on chemistry, which was long regarded as the standard work on the subject. He died in 1738. It would take far too long even to name the many illustrious men who have contributed to the advancement of chemistry. It must suffice if I refer very briefly to three or four. Joseph Priestley, who was born near Leeds in 1733, was the discoverer of oxygen gas and ammonia. Lovers of soda water owe their favourite drink to him. He has been called the father of pneumatic chemistry. Henry Cavendish, the eccentric genius, was a born philosopher and experimenter. His researches into the chemistry of gases, his discovery of the composition of water, and of the nature of air; and the experiment which bears his name, to determine the density of the earth, were very remarkable. The name of John Dalton, the son of a Cumberland weaver, will always be remembered in connection with the atomic theory which he propounded. He was, besides, one of the pioneers of meteorology; and is said to have recorded many thousands of observations. He seems to have been the first to describe colour-blindness, which was called Daltonism. His whole life was devoted to science and he declared he was too busy to find time to get married, so he died a bachelor. Another very celebrated chemist was Johann Berzelius, a Swede, who discovered selenium, thorium, and other chemical elements. His life was devoted to scientific research and he was the author of a text-book on chemistry. He was also the inventor of the system of chemical symbols. His contemporary, Sir Humphrey Davy, who was born at Penzance in 1772, invented the miner's safety lamp, was the first to show the electric light, burnt a diamond to prove that it was only carbon, and carried out many researches to demonstrate that alkalis are compound substances. It would be impossible to do full justice to the wonderful work of the next great man on my list, Michael Faraday. He was the son of a blacksmith and was apprenticed to a bookbinder when Davy engaged him as his assistant. His name will always be most closely associated with his experiments in electricity and magnetism, which paved the way for the wonderful development of electricity as a motive power and for other purposes. He died in 1867. It was Luigi Galvani, professor of anatomy at Bologna, who, through experiments with a frog, discovered animal electricity in 1791; and his compatriot, Alessandro Volta, professor of natural philosophy at Pavia, who invented the pile or chemical battery which bears his name, and which, later, proved of such importance in telegraphy.

While speaking of electricity I must not forget to mention Benjamin Franklin, who, besides his many other vocations, carried on experiments in electricity which resulted in his invention, about 1746, of the lightning conductor. He was born at Boston, Mass., in 1706 and died in 1790.

This was about the time of the great industrial revolution and the beginning of our commercial and industrial supremacy, due to the application of steam-power to machinery. Thomas Newcomen, who was born at Dartmouth in 1663, was the first to make a steam-machine for pumping water from mines. Some seventy years later James Watt was born at Greenock. He was the greatest inventor of his time and having turned his attention to the steam-engine he presently made it a practical proposition. We do not know who was the first to apply steam-power to navigation. The Americans claim that the first steamboat ran on the Hudson in 1806; and the French that a steamboat was tried on the Saone, at the end of the XVIII century. A vessel, called the Comet, built by Henry Bell, seems to have run between Glasgow and Greenock, carrying passengers, in 1812. A cross-Channel service of steamboats between England and France was started about 1821. The first steamer to cross the Atlantic is believed to have been a vessel built in Canada in 1830. Meanwhile, Richard Trevithick, the son of the manager of a mine in Cornwall, was at work adapting the steam-engine to road transport and he seems to have been the first actually to transport passengers on a road in a steam carriage very early in the XIX century. His great rival, George Stephenson, who was born in the neighbourhood of Newcastle in 1781, made his first locomotive in 1814 for use at a colliery. The first railway to be opened for the conveyance of passengers was the Stockton and Darlington, the centenary of which was celebrated in September, 1925, and the next was the Manchester and Liverpool, for which Stephenson built his famous Rocket, which attained a speed of 30 miles an hour.

The first electric telegraph was the so-called needle instrument invented by Cooke and Wheatstone (afterwards knighted) and tried by the G.W.R. between Paddington and West Drayton, in 1838 or 9. The Morse code was invented by Samuel Morse, of Massachusetts, who also invented the first recording instrument, which, after long delay, was tried in America. At first it was only possible to send a single message along a wire at one time, but thanks to various wonderful improvements, it is now possible to transmit several messages simultaneously in either direction along a wire. A triumph, surely, of inventive genius. The first submarine cable was laid in 1851 between France and

England. The first attempt to lay a cable across the Atlantic in 1857 ended in failure; and so did the next two attempts. Messages, it is true, were transmitted, but the cables soon ceased to function. A great deal of money was lost, but more money was raised, and profiting by the experience gained, another cable was laid and success was achieved. And now it may be said that the whole world is linked up by cable, the last to be laid, only a short time ago, having a length of some 3,500 miles and a transmitting capacity, thanks to what is called the loading of the cable, many times greater than that of an ordinary cable. I should mentioned that the late Lord Kelvin, then William Thomson, did much, by his brilliant researches in electricity and his invention of delicate instruments, such as the siphon recorder, to ensure the success of cable communication. From the telegraph and the cable one comes to that greater wonder the telephone, which, I should say, is the most useful invention that has been made in recent years. We owe it to the physicist, Alexander Graham Bell, who, though domiciled in the U.S., is a Scotchman by birth. The telephone when first shown in 1876 was regarded as a marvellous scientific toy. Until recently it was only possible to use the telephone on land lines, but now one can speak across the ocean. From the telephone we pass to that greatest of wonders, Wireless. While according due praise to the genius of Marconi, we must not forget the pioneer work done by Sir W. H. Preece, who, as long ago as 1892, succeeded in sending signals a distance of some three miles without wires; or the brilliant researches of the German physicist, Heinrich Hertz, still earlier, which pointed the way, as it were, to the transmission of wireless signals. The development of this wonderful invention has been so rapid and so great, from the day when Marconi first sent a message across the Channel to the present time, when Big Ben can be heard in Borneo almost at the moment when it is striking in London, that one may well exclaim : What next?

As the first to describe in 1802 a method of copying pictures by light we may consider Thomas Wedgwood as the father of photography. Unfortunately, Wedgwood was unable to fix his photographs, so they could not be shown in daylight. It was the Frenchman, Nicephore de Niepce, who found out how this could be done. Niepce began his experiments in 1814, but it took him some 13 years to bring his experiments to a successful conclusion. He, rather than Daguerre, his co-worker, should be regarded as the originator of the Daguerreotype process. The first daguerreotypes, taken about 1839, were portraits on silvered copper plates and were so good that everybody wanted to be taken. A wit of the time said that London suffered from a daguerreotype mania. And when some one complained that the sun was not to be seen in town a fashionable lady observed " How can you expect to see the sun when it is so busy taking portraits in Regent Street."

Fox Talbot was the first to make negatives from which positives could be printed. His negatives were first made on paper; but the collodion process soon followed. This we owe to F. Scott Archer about 1850. The next improvement was the discovery of the gelatine process by Dr. R. Maddox about 1871. This paved the way for the hand-camera and the roll films and daylight-loading, with the snap-shotter *en evidence* everywhere. Plates have been so improved that it is now possible to take objects, such as bullets in flight, which are moving so rapidly that they are absolutely invisible to the eye. In astronomical research photography is of the utmost importance. By prolonged exposure details of such objects as nebulæ and star-clusters are shown which could not possibly be obtained in any other way. And I believe that stars have been discovered on some of these plates which the most careful scrutiny of the heavens by the largest telescopes had failed to reveal.

In 1895 two young Americans, the brothers Orville and Wilbur Wright, took up their abode at Kitty Hawk, a lonely region in North Carolina. They were bent on solving the problem of aerial navigation. For many weary months they toiled at the task until at last, on the 17th December, 1903, success rewarded their efforts. On the morning of that day, Orville Wright flew for a few seconds. Later in the day his brother, Wilbur, repeated the experiment, and remained in the air for about a minute. The aeroplane had come into existence. The balloon, which, of course, was the forerunner of the aeroplane, was invented by the brothers Montgolfier, of Lyons, in 1783. The first live cargo to be sent up in their balloon comprised a sheep, a cock, and a duck. The first man to risk his life in a balloon was a Frenchman, Pilatre de Rozier, who ascended on the 15th of October, 1783.

The forerunner of the present high speed internal combustion engine was the gas engine invented by Dr. N. Otto in 1876. An engine using petrol or benzine was introduced three or four years later by Gottlieb Daimler. For use in aeroplanes it is essential to have a comparatively light engine which develops great power and high speed. Daimler's engine was first applied to road traction in France and a French firm were the pioneers in the motor car industry.

The bacteriological researches and discoveries during the latter half of the last century of Pasteur, and of Koch, who discovered, in 1882, the bacillus of tuberculosis and, later, the comma bacillus of cholera, and the brilliant work of Lister in antiseptic surgery, should be mentioned. The work of Sir Ronald Ross on the anopheles mosquito as the carrier of the protozoa which cause malaria, and the researches of the American doctors, Finlay Lazear, who lost his life, Caroll, and others in Cuba on the stegomyia, as the carrier of the germs of yellow fever, were of great importance in showing how those diseases could be prevented, and how regions, formerly regarded as death-traps, could be turned almost into health resorts. The discovery of a means of deadening pain during operations is also notable. An anæsthetic was first used in the U.S. by an American dentist in 1844. Two years later, also in America, ether was successfully tried in surgical operations. It was first used in England in December, 1846.

Coal gas was first used to light a building at the end of the XVIII century by William Murdoch. The gas mantle was invented by Auer von Welsbach in 1884. The electric light was first shown by Sir Humphrey Davy more than a hundred years ago; but it could not be used commercially until the dynamo was invented. A Russian, named Jablochkoff, invented what was called an electric candle in which two parallel carbon rods were used to produce an arc light. The system was tried in Paris in 1877 and soon afterwards in this country. A little later J. W. Swan invented the electric light bulb.

Many of us can remember the bicycle with a big wheel in front and a small one behind, invented about 1872. There was a difficulty in mounting, a greater difficulty in dismounting, and an ever-present danger of falling over the handle bars. It was superseded by the present machine at first called the " safety," the invention of a Mr. Starley about 1885. The pneumatic tube was invented by a Belfast veterinary surgeon named Dunlop, in 1888. The sewing machine was invented by a French tailor, named Thimonier, about 1840. It was a clumsy machine and not adaptable for domestic use. Elias Howe, an American, brought out a portable machine. The first practical type-writer was, I believe, the Remington, so called after the American firm which made it. In the earliest machines only capitals were used. Among minor inventions I may allude to matches, which were invented in 1827 by John Walker.

One of the marvels of recent times is the making of an imitation silk from wood pulp. The first person to work at the process was a Frenchman, the Count de Chardonnet. After long continued experiments he finally succeeded in producing a thread which closely resembled silk, but which had the serious disadvantage that it was highly inflammable. This defect, however, was soon overcome, and to-day we have a product so excellent that it threatens to drive the silkworm out of business.

The brilliant researches of W.H. Perkins in the middle of last century, resulting in the discovery of the first of the coal tar dyes, a beautiful mauve, paved the way for the great coal tar industry. Perkins's discovery seems to have attracted less attention in this country than it should have done, and it was left to German chemists to continue investigations on the same lines, which led to the establishment in Germany of the very lucrative coal tar industry. It seems amazing that, from that unpleasant, evil-smelling coal-tar, lovely colours, exquisite perfumes and a sweetener that is sweeter than sugar can be obtained.

We owe the gramophone, orginally called the phonograph, the idea of the cinematograph, and many other useful inventions, to that remarkable man, Thomas Alva Edison, who was born in the small town of Milan, Ohio, in 1847. As sometimes happens when an inventor has made a great name, the ubiquitous reporters try to get sensational copy for their papers by ascribing to him certain inventions which he never even dreamed of. Edison was more than once the victim of such reporting enterprise, as, for instance, when it was announced that he had invented an ever-clean shirt. The front of this remarkable garment was supposed to be formed of a number of superimposed dickeys, and when the wearer wished to present a clean front to his audience all he had to do was to tear off the outer dickey.

In 1868 a remarkable discovery was made by Sir Norman Lockyer. Examining very carefully the solar spectrum, he noticed a yellow line in the immediate proximity to the D lines of sodium. It could not be assigned to any terrestrial element, so it was then thought to be an element existing only in the sun, and he named it helium, from helios, the sun. Thirty years later Sir William Ramsey found helium as an inert gas in the mineral uranite. Since then it has been found in many other minerals and even in very minute quantity in the atmosphere. This mention of the atmosphere reminds me of another element that was found in it as an inert gas by the researches in 1894 of Lord Rayleigh and Sir William Ramsey, to which they gave the name of argon.

It had long been the desire of physicists to liquefy gases, including the air, by subjecting them, under pressure, to a very low temperature. Several workers took up the task, and success rewarded their efforts about the middle of last century. I think it was in 1878 that Sir James Dewar described, at one of the meetings of the Royal Institution, a method that had been devised abroad for liquefying air. I have seen liquid air more than once myself; and it always seemed to me a wonderful sight to see it poured out of a flask like boiling water, and yet so cold that one dared not touch it. What is considered to be the absolute zero or the cold of space at which all motion probably ceases is—273 Centigrade. A cold very near this was reached by the late Professor H. K. Onnes, of Leyden, when, in 1908, he succeeded in liquefying helium. Since his death a still nearer approach to the zero was reached by Professor W. H. Keesom, also of Leyden, who a year or two ago solidified helium. Professor Dewar, in the course of his experiments, invented a vacuum flask which can best be described as a bottle within a bottle, the space between being a vacuum. This is what is now known as the thermos flask.

We used to regard the atom as the smallest particle, as something which, as the term implies, could not be split up into anything smaller : now we learn that so far from being indivisible it is a sort of solar system on an extremely minute scale, with a positively charged particle called the proton in the centre and smaller negatively charged particles, called electrons, circulating round it. In 1895 Professor Röntgen, of Wurzburg, while engaged in experiments with a Crookes' tube, discovered the mysterious rays which he called the X rays and which have proved so useful in surgery but so dangerous to experiment with. The following year Professor Becquerel, of Paris, discovered radioactivity. This discovery was shortly followed by the discovery, by Madame Curie and her husband, of radium and polonium. Polonium was so called because of Madame Curie's Polish origin. Radium seems destined to play a very important part in the cure of that terrible disease cancer.

It will be fitting, I think, if I conclude with a few remarks on some of the most interesting discoveries in astronomy.

Hipparchus, who observed at Rhodes in the 2nd century B.C., is sometimes called the father of astronomy. He is reputed to have discovered the precession of the equinoxes and he was the first to make a catalogue of the stars. Tycho Brahe, the Swede, who lived in the XII century, was a great observer, but does not appear to have made any discovery of importance. Galileo Galilei was, of course, the outstanding figure of the XVII century in the astronomical world. He discovered the four major satellites of Jupiter; he noticed the spots in the sun, and from their motion announced the rotation of the sun; he observed the phases of Venus; and he saw what seemed to be excrescences on each side of Saturn. It was Huygens who found out the meaning of these excrescences by seeing the rings in 1658. Römer, a Danish astronomer, by his observations on the motion of one of Jupiter's satellites, discovered that light is propagated at a definite velocity. Edmund Halley, whose name has been given to the great comet which he observed in 1680, and whose return he predicted, made a catalogue of the stars in the southern hemisphere. The great Sir William Herschel, who was born at Hanover in 1738, and came to this country as a musician and a teacher of music, took up astronomy while living at Bath and did more to advance the science than almost any other observer. Being too poor to buy his telescopes, he made them himself. It is impossible to speak of all that Herschel did for astronomy, I can only mention three discoveries of outstanding importance, the discovery of Uranus in 1781, the discovery of binary stars, and the discovery that the solar system is in motion through space. The French astronomer, La Place, who was born in 1749, is known to us all as the author of the Nebular Hypothesis, which, for many years after its publication in the *Système du Monde,* was generally accepted as the most tenable explanation of the origin of the solar system, but which, of course, is no longer held. Dr. Wollaston, though not an astronomer, should also be mentioned in connection with his discovery of the dark lines in the solar spectrum. These lines were mapped by Joseph Fraunhofer, of Munich, after whom they are called, and their significance was explained by Foucault in France and Kirchhoff in Germany about the middle of last century. This led to the invention of the spectroscope and to the discovery by its means of the nature of the sun and the nature of the stars, the motion of the latter along the line of sight, and the rate of that motion. On the 1st January, 1801, the Italian astronomer, Piazzi, observing at Palermo, discovered the first of the minor planets or asteroids, a small body about 500 miles in diameter. It was named Ceres after the goddess of agriculture, and its discovery was soon followed by the discovery of several similar bodies. Three other important discoveries remain to be noted. In 1838 the first stellar parallax was determined, that is to say, that for the first time the distance of a star was ascertained. It was a difficult problem to solve, and it is a remarkable fact that it was solved almost simultaneously by different astronomers working in different regions, by Bessel in Germany, who determined the parallax of 61 Cygni; by Henderson at the Cape of Good Hope, who determined the parallax of alpha Centauri; and by Struve, who about the same time determined the parallax of the brilliant star Vega in the Lyre. The next discovery was that of the planet Neptune in 1846. It was first seen as a planet by Dr. Galle at Berlin after its probable position had been indicated by John Couch Adams, of England, and Leverrier, of France. The last discovery to be referred to is the recent discovery of a means of determining the angular diameter, in other words, the size of a star. When one considers that even in the largest telescopes no star yet observed shows an appreciable disc, the task of attempting to determine the size of even the nearest might well be deemed a hopeless one. But by the application to the giant Hooker reflector, on Mount Wilson, of an instrument called the interferometer, this marvellous feat has been accomplished. The first star to be examined was the conspicuous red star in the shoulder of Orion, originally called by the Arabs Betelgeuse, which means shoulder. The trial was made by Mr. Pease on the 13th of December, 1920, apparently with complete success. The linear diameter of the star as given by Professor Hales in his charming little book, *The New Heavens,* is 215,000,000 miles. Compared with such a star, our sun, enormous though it may appear to us, is but a pigmy.

When we look upwards on a clear night, and see the vault of heaven studded with stars, the thought must come to many of us—what is there beyond those stars? Every increase in the power of the telescope reveals more stars and still more stars, and beyond again, at distances inconceivable, those mighty mysterious nebulæ which may be universes like our own. And then—what? Space! But what is space? We do not know. All we say is that we are in the hands of that Great Being to Whom all things are known.

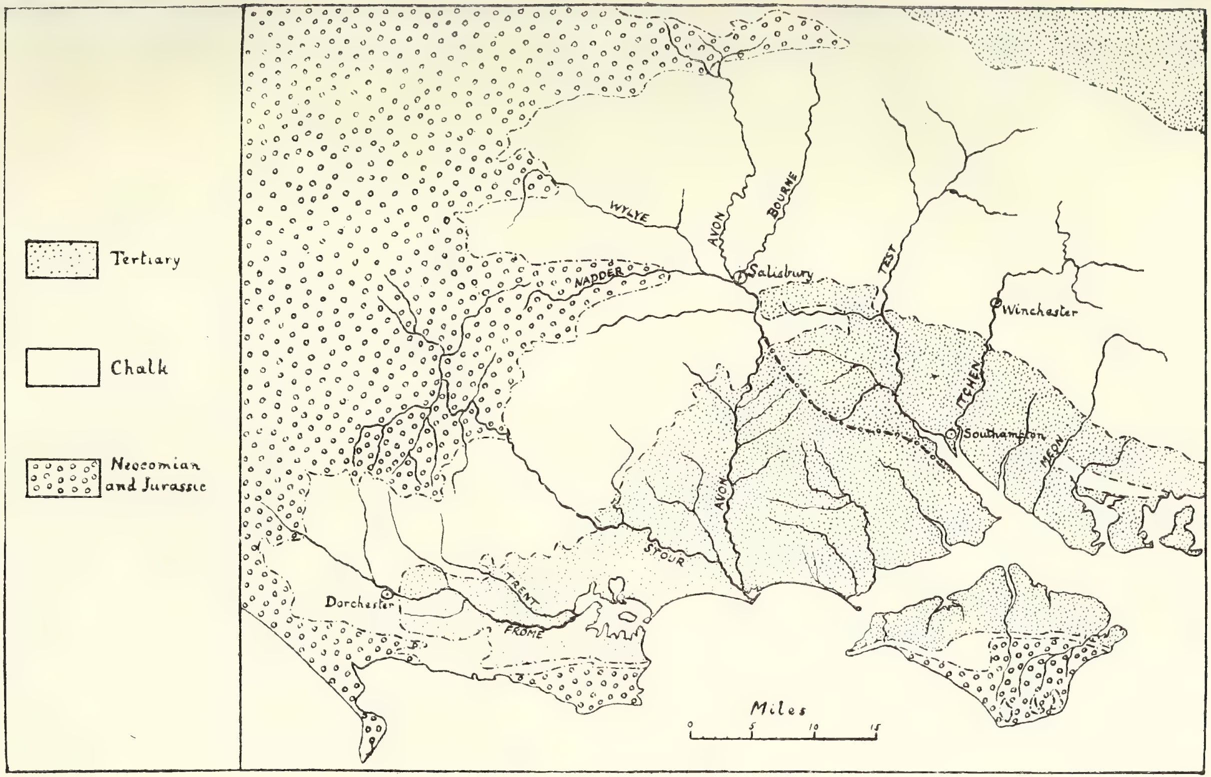
Selected Papers.

"The River Solent and its Tributaries."

By Henry Bury, M.A., F.G.S.

The river system of our district—and indeed of most districts—is so intimately bound up with the geological (tectonic) structure, that some preliminary acquaintance with the latter is indispensable. Up to the Oligocene period the various strata, secondary and tertiary, with which we have to deal, had retained approximately their original horizontal attitude; but early in the Miocene the earth suddenly awoke from a long period of quiescence to one of intense activity, with mountain building and folding of the crust in nearly every part of the globe. The British Isles were not as much affected as many other parts of Europe, but over a large portion of England the strata were tilted towards the south-east, while the south-eastern regions—including the Thames Valley and the Bournemouth area—were thrown into a series of folds (anticlines and synclines) which run for the most part east and west; and it is with one of these synclines, together with the anticlines on either side of it, that we are here concerned. We may compare these folds, at any rate as regards their form, with the waves of the sea, the anticlines corresponding to the crests, and the synclines to the troughs of the waves; and just as the latter, especially near the shore, are steeper on the leeward than on the windward side, so the anticlines of the south-east of England, which appear to be due to pressure from the south, present their steepest slopes towards the north.

The main syncline of our area runs in a fairly straight line from near Dorchester to beyond Spithead, passing close to Bournemouth on its way, but while the crest of the southern anticline is nowhere more than 8-10 miles away, the northern anticline, with its much more gentle slope, retreats in its most distant part to something like 50 miles. The two anticlines moreover differ in other particulars. The southern one, which has suffered much from denudation, and has had great portions removed by the sea, runs approximately parallel to the syncline, and all along its northern face it presents a sharp dip towards the north. But on the other side of the syncline the structure is much more complicated, and in place of a single anticline dipping everywhere towards the south, we find a series of folds, which cause the dip to veer round from south-east in the neighbourhood of Blandford, to south at Salisbury and Romsey, and then to south-west from Winchester to Portsmouth. In this way the whole region is bent into what is called the "Hampshire Basin";



THE RIVERS OF THE HAMPSHIRE BASIN.

THE BROKEN LINE INDICATES, ACCORDING TO CLEMENT REID, THE FORMER COURSE OF THE UPPER AVON.

BRITISH
MUSEUM
18 APR 29
NATURAL
HISTORY.

but it is a very asymmetrical basin, and is perhaps rather to be compared to a salad plate, with one edge straight. Some idea of the shape of this basin can be gathered from the distribution of the tertiary strata (see map): originally they covered the whole district, but denudation has removed them from the anticlines, and reduced them so nearly to the same level that their margin, from under which the chalk everywhere emerges, sweeps round in a broad curve towards the north, while to the south (making allowance for the part removed by the sea) it runs in a nearly straight line.

Now let us imagine such a fold as has just been described to be lifted gradually up from under the sea. The first portions to rise above water would be the summits of the anticlines, and the earliest streams draining them would follow the slopes of the fold, taking the shortest course to the sea, which still occupied the synclinal trough. These may be called either *transverse* streams, because they run at right angles to the crests of the hills, or *dip* streams, because they follow the direction of the dip of the strata; but the former is preferable. If then the land continued to rise, the bottom of the syncline would also at length emerge; and as such synclines are (in practically all cases) lower at one end than the other, it would be occupied by a river, which would receive the transverse streams at right angles, and may be called *longitudinal* ; but another name for it is a *strike* stream, because it follows the strike of the strata, which is at right angles to the dip.

There we have one of the simplest forms of drainage, in which the courses of all the main streams are the direct consequence of the earth movements that produced the fold and raised it above the sea; and to these American writers have given the name "consequent streams." But usually, as denudation proceeds, complications arise, and yet another series of rivers may be produced. For example, in the Isle of Purbeck the removal of all the upper strata from the crest of the anticline has exposed a number of different beds—Portland, Purbeck, Wealden, Cretaceous, and Eocene—ranged in parallel longitudinal strips; but these beds are of different degrees of hardness, and the consequence is that, while the Portland and Purbeck stand up as one range of hills, and the chalk as another, the soft Wealden and Lower Cretaceous strata between them have been worn away, and form a valley.* In this valley several longitudinal streams have developed, one joining the sea at Swanage, and one at Warbarrow; while between them the Steeple and the Byle, though mainly longitudinal, pass transversely across the Chalk at Corfe, and after uniting to form the Corfe river, continue northwards to Poole Harbour. So far as they are transverse, these are to be regarded as consequents, appearing the moment the anticline was uplifted; but their longitudinal components, which can only have arisen after denudation had exposed the Wealden Beds, are presumed to be of later date, and are called *subsequents*. It will be noted that while the words "transverse" and "longitudinal" refer solely to the direction of the streams, "consequent" and "subsequent" attempt to define their order of formation, irrespective of direction; for although most consequents are transverse, we shall presently meet with an important longitudinal one; and while most subsequents are longitudinal, considerable deviations are by no means uncommon.

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* In the Bournemouth Natural History this valley is repeatedly spoken of as "the Wealden syncline" (pp. 47, 53, 306, 354, 355); but syncline is not synonymous with valley, and it is really only part of the flank of the southern anticline.

Besides the Corfe River we have three other transverse consequents on the southern anticline, all in the Isle of Wight (East Yar, West Yar, and Medina), and doubtless there were one or two more between the Needles and Handfast Point, when dry land connected these two points; but owing to the short distance between the anticline and syncline on this side of the basin, all these streams are necessarily small, none probably ever having exceeded 13 miles in length.

Until the sea broke through its southern boundary, the syncline was occupied by a large consequent river, which geologists have agreed to call the Solent or Frome-Solent River; but although part of its course is clearly indicated by the Solent, all that remains of the river itself at the present day is the Frome. The causes which led to its invasion by the sea will be considered later.

On the north side of the syncline the long and gentle anticlinal slopes allow of the development of a number of important transverse rivers; and just as the direction of the dip shifts round the curve of the basin from south-east to south-west, so these rivers follow approximately the same course. Thus the Puddle (or Trent) and the Stour run roughly south-east; the Avon and the Test south; and the Itchen and the Meon south-west. Moreover, if we trace carefully on the map the sources of these rivers, we shall find that they too follow a curve, which is roughly parallel to that of the Eocene Beds: most of them rise in the Chalk, but in the north-west quadrant, where the dip is somewhat steeper, the summit of the anticline has been removed by denudation so that the Stour and the Nadder rise in Jurassic strata; but that does not prevent them from completing the curve. The correspondence between the dip and the course of the rivers is in many cases far from exact, but that is only what we might expect, first because the anticlines and synclines are by no means the simple structures we have so far represented them, but are made up of a number of minor folds, so that it is often necessary to distinguish between the *regional* dip (of the main fold) and the local dip, due to minor anticlines; and secondly because where we have a wide expanse of strata of nearly uniform softness (e.g., the various Eocene beds) there is nothing to compel the rivers to adhere strictly to the lines of either dip or strike, and we find them running in very varied directions. It is doubtless in some way due to the difference in hardness between the Chalk and the Eocene (though the details are obscure) that so many of our transverse rivers change their courses at or near the point where they enter on the softer strata. The Stour, for example, where it passes through the Chalk at Blandford, closely follows the dip to the south-east; and that it formerly continued further in that direction is proved by the gravel beds which it has deposited high up on the Corfe Hills. Something however turned it aside near Corfe Mullen (on the Eocene beds) and while cutting its valley lower it has shifted northwards to its present position. The Avon for several miles below Salisbury runs slightly east of south, about in a line with the dip; and here again the gravel beds of the New Forest Plateau seem to indicate that it continued that direction some miles further; but it now turns southwards near Downton (very near the edge of the Eocene beds), and like the Stour, while lowering its valley, it has shifted its course—this time to the right instead of to the left. Finally the Test where it enters the Eocene runs a little west of south, then it bends round to the south, and again, below Romsey, to the south-east, into Southampton Water. In spite however of all these deviations there is enough correspondence between the dip and the rivers to establish at least a *primâ facie* case in favour of regarding them as consequents, developed on the anticline when it first rose from the sea; and except in one case, which we shall deal with later, this would be generally admitted.

We must, however, be on our guard against a too great anxiety to label every stream in accordance with the accepted classification, for this has led to several misdescriptions especially among our minor rivers. Thus there is a group of streams running parallel to one another from the New Forest Plateau to the Avon, in a south-westerly direction, which are described in the "Natural History of Bournemouth" (p. 56) as "obsequents"; but this term applies to transverse rivers which run in the opposite direction to the dip; and as in this case the dip is about south-east, the streams are more nearly longitudinal than transverse. Probably, however, they have developed quite independently of the stratification, during the lowering of the bed of the Avon and the shifting of its course to the west. Another group of rivers (Avon Water, Lymington River, and Beaulieu River) takes a roughly south-easterly course from the New Forest Plateau to the Solent. They are described in the volume already cited (p. 59) as "strike streams"; but they do not at all closely correspond with either the strike or dip, which are complicated here by the nearness to the bottom of the main syncline (itself composed of a series of smaller folds) and by a local anticline near Lymington. Probably they too must be regarded as subsequent streams of independent origin.

But the river about which the most startling statements have been made is the Avon, which was declared by the late Clement Reid* to have consisted originally of two separate parts—a Lower Avon rising a little above Fordingbridge, and an Upper Avon which found its way into Southampton Water (see the broken line on the map) forming part of a former "Southampton River." Then the Lower Avon, stimulated by the incursion of the sea into the Solent valley, grew northwards until it captured the Upper Avon near Downton. The admirable work done by Clement Reid in other departments of geology gave weight to his views, and has led to their wide acceptance, yet his evidence, as may be seen in the following summary, is not only inadequate, but largely irrelevant.

* Mem. Geol. Surv. "Ringwood" pp. 30-32.

(1) The former course of the Upper Avon "connected in a direct line the Salisbury rivers with Southampton Water." But there are no less than four "Salisbury rivers" running in various directions, and the alleged course (see map) is no more in a direct line with them than the Lower Avon. But in any case mere alignment is not satisfactory evidence.

(2) There is a "ridge of gravel" stretching from Woodfalls (near Downton) to Picket Corner and Long Cross, which "seems to mark approximately the ancient course" of the old river. But the "ridge of gravel" runs *uphill* between the points mentioned, and it is moreover not a ridge, but merely the northern edge of the great gravel-capped New Forest Plateau, the axis of which slopes, not towards Southampton Water (south-east) but to the south-west. A considerable part of this plateau, with its gravel, is attributed by Clement Reid himself to the Lower Avon (or to the Upper and Lower after junction), and the distinction drawn by him between the "high plateau" and "higher terraces," besides being of doubtful validity, brings the former much too far south for the alleged connection with Southampton Water. The history of the whole plateau is very obscure, but it is at least a plausible alternative that the Avon (as a single river) flowed south-eastwards as far as Long Cross, and then bent round to the south-west; while on any hypothesis it must be admitted that as it has lowered its valley it has retreated westwards.*

* For yet another possible hypothesis see Proc. Hants Field Club, 1927, p. 7.

(3) A pebble of Purbeck chert, which Clement Reid says must have come from the Nadder valley, was found not far from the summit of the plateau. Apart however from some doubt as to its source, the utmost that this pebble could prove would be

that the Avon formerly flowed at this high level (nearly 400ft. O.D.) and considerably to the east of its present course; but that is not in dispute: what is required, before its extension to Southampton Water can be granted, is that a similar pebble should be found near the latter; and that has not been done.

(4) The capture of the Upper Avon by the Lower is supposed to be due to the breach of the Solent River by the sea, which, in the opinion of Clement Reid, must have produced "an immediate and extremely rapid lowering of all the river-courses belonging to the upper half of the old system of the Solent." We shall show later that such an effect is very improbable; but even if it were admitted, it would afford no proof of capture; for the Stour must have been affected in the same degree as the Avon, yet it has never been suggested that the former river originated in two parts.

Apart from the intrinsic weakness of the evidence, the whole case, as presented by Clement Reid, completely ignores all the usually accepted symptoms of river capture; and in order to appreciate what those symptoms are, we cannot do better than study the remarkably clear example to be found on the borders of Hampshire and Surrey, where the river Wey has beheaded the Blackwater. That portion of the former river which flows past Farnham was at one time part of the Blackwater; but the latter is now, at Aldershot, a tiny stream flowing in a valley far too big for it, and is only separated from the Wey by a flat marshy valley, about 1½ miles long, which cuts transversely across the line of the North Downs. But at the present day the Wey, about a mile below Farnham, takes a sudden right-angled bend to the south-east, and at this point its valley narrows, although there is no change of soil. Omitting minor coroborative features, we may sum up the evidence in favour of river capture under four headings:—(1) A right-angled bend in the river Wey, which is called the "elbow of capture"; (2) a narrowing of the valley of the Wey immediately below the "elbow"; (3) the alignment of the part above the elbow with the Blackwater; (4) the existence of a flat marshy valley between the two rivers, marking their former line of junction. In any case of river-capture such as was postulated by Clement Reid, it would be reasonable to expect all these four features to be present, but as a matter of fact they are entirely absent! There is no elbow of capture, no narrowing of the valley, no marshy tract, and—strangest of all—no beheaded river; for that is a feature impossible to obliterate, and no case for river capture can be established without it. Even if, in order to evade this objection, we regard the Blackwater (a small tributary of the Test, not the river near Farnham) as the beheaded river, we only reject the points on which Clement Reid relied (the gravel ridge and the chert pebble) without obtaining any corroborative evidence; while the assumption made in the "Natural History of Bournemouth" (p. 54), that the Upper Avon ran along the Mottisfont valley, only makes matters worse; for it involves the ancient river in two bends almost at right angles (at Alderbury and at Mottisfont), which is so improbable that overwhelming evidence would be required before we could accept it.

The further statement is made in the work just cited (pp. 54-55) that the relative ages of the Avon, the Stour, and the Frome, can be learnt from the steepness of their banks, and the extent of their meanderings; but such an inference as to age is always unsafe unless the differences are very marked, and all the factors are carefully considered. The right bank of the Avon is not steep at all, and the left bank is only so because its terraces are protected by gravel. The right bank of the Stour (which is erroneously stated to have no terraces) is almost as steep, and for the same reason. Why the gravel should be concentrated on one bank in each case, it is difficult to say; but it does not affect the argument: both rivers are flat on one side and steep on the other, yet it will hardly be suggested that the opposite sides are of different age! The Frome is only less steep than the others because its gravel beds are less developed. All three rivers meander to very much the same extent, and all three must have been equally affected by the change in level (if any) resulting from the breach of the Solent river by the sea. The supposition therefore that they differ in age is not justified by the facts, and would only lead to further difficulties, which it is not necessary to discuss.

It remains for us to consider the breach of the Solent River by the sea, and to show (1) that it did not occur at the early date demanded by Clement Reid's theory; (2) that in all probability it caused no lowering of the valleys of the Avon or other rivers. At various points on the south coast there are traces of an old marine beach, slightly above present sea-level, and on it we often find large boulders of granite, diorite, and other rocks foreign to our district. Some of these "erratic" boulders, which may weigh several tons, must have come from Brittany and Cornwall, and appear to have been transported up the Channel by floating ice. They are numerous in the neighbourhood of Chichester and Langstone Harbours, but get scarcer as we go west, and are not found beyond Lee-on-Solent; while in Bournemouth and Christchurch Bays and in the western arm of the Solent they are entirely absent. We are therefore justified in inferring that at the time of the raised beach—that is to say at a late stage of the Pleistocene—the Solent River was still intact, though the sea extended up it for a few miles above Spithead. But although Clement Reid, in his latest paper,* accepted this evidence, yet even then he never realised its fatal effect on his

*Proc. Bournemouth Nat. Sci. Soc. Vol. VIII. pp. 73-82.

theory of the origin of the Avon; for the lowest point in the hill near Downton, over which the Upper Avon is supposed to have passed, is more than 200ft. above the present river, and such a position is quite inconsistent with a sea-level in the Solent only a few feet (50ft. at most) above present Ordnance Datum.

In the "Natural History of Bournemouth" (pp. 333-4) the breach of the Solent River is made to antedate the raised beach, and an elaborate theory is advanced to account for the alleged increase of steepness, during the last 30-40 years, of the Bournemouth cliffs; but this increase of steepness is almost certainly mythical, and in any case it could not override the evidence of the erratic boulders.

The effect of the breach of the Solent River on the Avon and Stour would depend upon the difference of level at that time between the sea and the river. If the latter had its mouth far away to the east (beyond Spithead) it might stand high above the sea opposite the breach, and the effect would be great; whereas if the river were tidal for many miles above Spithead, little or no change would follow. An example of the former case has occurred, on a small scale, in Christchurch Bay, where Becton Bunny was formerly the head of a branch of the Danes stream. The sea, however, cut into the middle of it, with the result that while Becton Bunny has adjusted itself rapidly to sea level, the only relic of the beheaded stream is a marshy valley known as Long Mead.

In that instance however, the sea had nothing to do but cut away the soft Tertiary beds, whereas in the case of the Solent River it had the much more difficult task of forcing a passage through the wall of Chalk which formerly stretched from Old Harry to the Needles; and assuming, as is reasonable, that one or two transverse streams had cut valleys through this wall, conditions favourable for effecting this breach would be most likely to occur during a period of depression of the land, when a situation might arise very similar to that seen in the valley of the Yar at the western end of the Isle of Wight. The tide flows right up from Yarmouth to Freshwater, where the soft Lower Cretaceous and Wealden beds, in which the Yar formerly rose, have been washed away by the sea, and nothing but a dam prevents a complete break through. Now at the close of the Pleistocene the land rose so much that our main rivers cut their valleys down about 80ft. below present sea-level; and then in early Holocene (Neolithic) times the land sank again and allowed the sea to invade these valleys. It is to that sinking, which continued almost to Roman times, that we owe the great harbours of Poole, Portsmouth, etc., as well as Southampton Water, and numerous creeks in the Solent (Lymington, Cowes, Yarmouth, etc.); it must have turned the lower part of the Solent River, from Spithead to Wareham, into an estuary, as well as producing creeks on both sides of the valley; and all that remained then was for the sea to remove the soft beds from the south side of the Chalk wall, when the valleys which pierced the latter would afford easy access to the river Solent. The only difference in level on the two sides of the barrier would be a tidal one, and while it would be sufficient to effect a rapidly widening breach, it would not be enough to produce any appreciable change in the Stour and Avon. The exact position of the stream or streams which thus, so to speak, betrayed the Solent River by opening doorways to the sea in its southern wall, cannot now be determined, for no reliance can be placed, in this connection, on marine soundings.*

In the above attempt to trace the history of the Solent River, only the simplest hypothesis has been considered, namely, that the river system arose as the immediate result of the Miocene folding, followed by uplift, while the whole area was still covered with Tertiary strata. Several writers, however, have held that the basin was under the sea in the early Pliocene period, and that a good deal of marine planation took place before the final emergence in late Pliocene or early Pleistocene times. There is much to be said in favour of this hypothesis, which should be carefully considered by all who wish to pursue the subject further; but it is not inconsistent with the main conclusion set forth above, that the principal rivers are consequents, resulting from the structure and uplift of the basin, and that there has been no important case of river capture, except the breaching of the Solent River by the sea, since the initiation of the system.

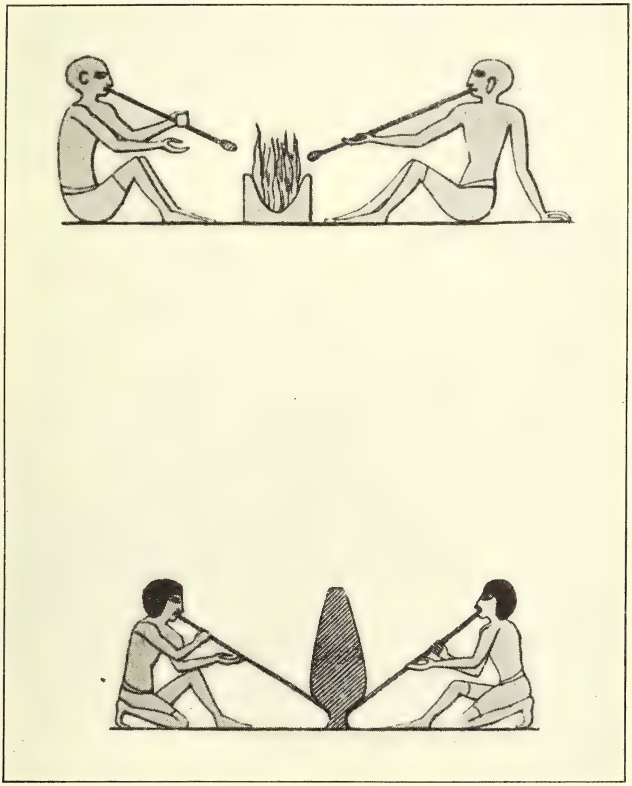
* Nat. Hist. of Bournemouth, p. 133.

"Glass and Glass Making."

By Dr. G. E. J. CRALLAN, M.A., M.B M.R.C.S.

I suppose there is no invention of man which has so revolutionised the world and conduced to the progress of civilization as glass. Except in the form of obsidian, or volcanic glass, it does not occur in nature, nor is any one of the materials which enter into its composition in any way similar to the finished substance in hardness or transparency. It is an article for which there is no substitute; for although mica is used to a certain extent, its limited range and output preclude the possibility of its commercial use even for windows alone, and it would be quite unfit for the infinite number of purposes to which glass is applied.

The origin of glass is lost in obscurity. The earliest known specimen is a small leopard's head in the British Museum; it is in the form of a seal and bears the name of an Egyptian King about 2400 B.C. From the annexed drawing on a tomb at Beni Hassan in Egypt it appears that glass-blowing was a recognised



GLASS BLOWING.
(FROM AN EGYPTIAN TOMB, CIRCA 2600 B.C.)

BRITISH MUSEUM
18 APR 29
NATURAL HISTORY.

industry in 2600 B.C. ; and there can be little doubt that it is to the Egyptians that we owe the discovery or invention of glass. Examples of early Greek work show Egyptian influence in every line, though a new feature appears in the form of additional colours. From this primitive source the knowledge of the nature and composition of glass spread over the whole known world.

The term glass is applied to the hard, brittle, non-crystalline, transparent, translucent, or opaque substance which results from fusing silica with active mineral solvents or fluxes, such as alkalis, earthy bases, or metallic oxides. Clays, granites and felspars are materials readily available.

Originally crushed and ground flints were used as the source of the silica : hence the name of " flint-glass " ; now white sand, as being more convenient and less expensive, is generally employed. It is obtained near Paris ; in Holland and Belgium ; in the Isle of Wight, at Aylesbury, Lynn and elsewhere in England ; the commoner varieties of sand, such as Reigate and Bagshot, and even red sand, are used for making bottles and jars. After thorough cleansing in water it is " burnt," to get rid of any organic matter, and then sifted to remove coarse grains or lumps.

The alkalis used are the carbonates, sulphates and nitrates of potash and soda ; these form very fusible glass but are not permanent, being more or less soluble in water ; therefore they cannot be used alone ; other bases such as oxide of lead, barium or lime must be added to form more insoluble combinations with the silica.

Other constituents may be boric acid, borax, zinc oxide, alumina, manganese oxide, arsenic and nickel oxide, and generally a proportion of " cullet," or broken glass scraps, which facilitates the melting and helps to make the mixture homogeneous by breaking up the striations which tend to develop in most glasses.

In the commoner varieties of glass, such as the dark-coloured bottles, crushed basalt and other igneous rocks are used ; these are natural silicates, containing lime, alumina, alkalis, iron and other elements in varying proportions. No single silicate is free from colour ; lead silicate is yellowish, bluish with more lead ; soda silicate is greenish, and so on ; but by judicious blending and the use of decolorizers such as manganese, nickel, etc., compound silicates are obtained giving less perceptible colour or crystal effects. Of course much depends on the purity of all these materials.

When sand, alkali, and lead oxide are heated together to a high temperature, the sand is dissolved by the action of the other materials until the whole becomes a molten mass. This action is very energetic, and the mass boils, with evolution of gases, until the solution, being complete, settles down to a clear quiescent molten liquid, soft and malleable, and of the consistency of treacle. It is then ready for working. The time and temperature for melting such mixtures vary according to the proportions and composition of the ingredients; its specific gravity varies from 2·4 to 4.

When heated gradually glass becomes softened, and while hot is plastic, malleable and ductile, so that it can be cut, welded, moulded, pressed, or drawn out into threads. When shaped it retains its form permanently on cooling; it can be toughened to a surprising degree by plunging it, while hot, into a bath of boiling oil; or, in the case of strong plates, by pressure. This toughened glass is very hard, and difficult to cut even with a diamond; but it is used for port-hole lights, miners' lamps, and steam-gauge tubing.

Glass is not a good conductor of heat; hence the necessity of slowness in cooling or "annealing" of glass ware; for if a piece of glass, expanded by heat, is rapidly cooled, the surface becomes strained or contracted on the interior, since it contains the heat longer, and in this condition the glass is apt to "fly," or collapse and fall to pieces. It is this non-conductivity which allows sunshine and heat to come into our rooms and greenhouses. Glass is also a non-conductor of electricity and therefore a reliable insulator.

Most glass is subject to attack, slight and slow, by water and dilute mineral acids or by continual exposure to a moist atmosphere; hence antique specimens often show a superficial decomposition in the form of a slight iridescence,, gradually increasing towards opacity, specially marked in objects which have been buried in the earth. There is a soluble form called "waterglass," made by fusing sand with an excess of alkali, which has various commercial uses.

The colours of glass are due to the use of various metals; e.g., crimson, from a compound of gold known as "Purple of Cassius"; purple, from manganese oxide; red, from protoxide of copper; blue, from cobalt or copper oxide; green, from sesquioxide of iron; yellow, from uranium oxide, antimony oxide or chloride of silver.

For the making of glass the various materials are examined and weighed in due proportion in the mixing room, where they are cast into a large wooden trough and mixed with a broad shovel. The mixture is styled the "batch"; in the case of flint glass the batch is of a salmon-pink colour, due to the presence of red lead.

The batch is melted in pots, their mouths just projecting from the wall of the furnace, and the product is known as "metal." These pots are made of the best Stourbridge fire-clay, and may contain as much as 18 cwt. at a time for the weekly complement.

Operations take place in the glass-house, lighted only by the glow from the mouths of the pots, and with the furnace in the centre. Below the floor is the cave, looked after by the "teazer" (Fr. tiseur=stoker), using 20 tons of coal per week. The glass-worker's chair is the centre of operations in the glass-house. It is a stout 4-legged bench with two arms, having long projections slightly sloped downward in front. A portion of the seat outside the right-hand arm serves as a shelf. In this chair the glass-maker sits, and across the sloping arms he rests his long blow-pipe, or his pontil. Each workman has three assistants—the Servitor, the Footmaker and the Boy. These four constitute a "chair," and a furnace will provide for from seven to 14 chairs according to its size. Various tools are employed; the Blow-pipe or Iron, a steel tube about 5 feet long, for the first gathering of the metal; the Pontil, a solid steel rod, as long as the blow-pipe for receiving the work when the blowing is finished; the Pucellas, a large pair of spring pincers, for shaping both the outside and inside of blown vessels; Shears for cutting the soft glass; there are, besides, flat pincers for compressing parts of a vessel, wooden pincers, calipers and compasses for measuring and marking.

When all is ready, the blower dips his tube into the liquid mass to fetch out a suitable quantity, which he then rolls on the "marver" (Fr. marbre), formerly a slab of marble, but now a smooth sheet of iron, which must be kept spotlessly clean. The lump is thus rounded off and compressed, the superfluity being squeezed away and restored to the workable mass; he then blows strongly through the tube till he gets the required size and shape of the piece. The servitor now dips his pontil into the glass-pot, gathers a small quantity of the metal and places it against the bottom of the piece, to which it at once adheres, and by a touch with a cold iron the piece is detached from its first support. The workman proceeds to shape the top of the piece, the pontil serving as a holder. The boy takes the blow-pipe, knocks off any adhering scraps of glass, and gets the blow-pipe ready for another gathering.

If a handle is required, the piece on the pontil is well warmed, and the servitor brings a suitable gathering of metal to the workman, who applies it to the selected spot and gradually draws it away till the glass reaches the proper thickness for the handle, when the maker cuts off the required length with the shears, bends the flexible glass to the proper shape with the pucellas, and presses the upper end against the rim of the piece. The whole is then reheated to perfect the junction. The piece is now detached from the pontil by a sharp tap or the application of a cold iron. The whole operation must be performed rapidly while the glass is hot, and should not take more than half an hour. For Moulding, the metal may be blown into the mould (or blown first and moulded afterwards), or poured into the mould and stamped by a plunger, forming what is called " pressed " glass. The mould is made in sections, with long handles on account of the heat.

The Annealing Oven consists of a sort of arched tunnel, 40 feet long, heated at one end, through which, by means of a windlass, the pieces are made to travel, growing cooler as they proceed, the heated end of the tunnel opening into the glass-house and the cool end into the warehouse. This motion is slow and may take three days or more. For Cutting, the glass must be of more than ordinary thickness and purity. A revolving shaft is fitted with countless pulleys of varied diameter bearing leather bands, which can be connected with the lathe. The cutters sit behind a hollowed bench, while above them hang large inverted cones containing mingled sand and water. Each cutter has a strong lathe in front of him, and numbers of wheels of different size and substance. He fits an iron wheel to his lathe, while a stream of sand and water falls from the cone overhead on to the rim of the wheel; the piece of glass is held against the edge of the wheel and the desired pattern worked out. Next, a stone wheel is used to smooth away the roughness left by the sand, and the final smoothness and polish is given by a wooden wheel with rotten-stone and putty powder. For Engraving, a small lathe is used, worked by the foot; the wheels, of various sizes, are of copper, moistened with a little oil mixed with emery powder; great skill, decision, and delicacy of touch are required for this work.

Rock Crystal glass takes a much deeper form of engraving; and for Cameo glass, opaque glass is laid over coloured glass and engraved in design by tiny points of tempered steel.

It is rather remarkable that the same methods of glass-making have been practised from the earliest time up to the present. Very little machinery has been introduced, except in the case of bottle-making. In some plants a 10-armed machine will produce automatically 120 gross of 16-ounce bottles in 24 hours, at a cost of eighteen pence per gross. Owens' machine produces 700 bottles per hour, say a million per week. Another machine is used for cracking off and polishing the edges of wine glasses, tumblers, bulbs, lamp shades and chimneys; there is also a " mechanical boy " for opening, shutting, and dipping the moulds, by which 300 or more articles can be finished off in an hour.

"The Bronze and Early Iron Ages"

By REV. E. H GODDARD.

Prehistoric Archæology seeks through the evidence discovered by excavation and otherwise, to piece together the story of the early stages of civilization before written or traditional history begins. The great stages of man's advancement in Europe are marked off by the periods known as (1) the Palæolithic or Old Stone Age, when men had learned the art of chipping flints into shapes serviceable for rough tools and weapons; (2) the Neolithic or New Stone Age, when they had made the considerable advance of knowing how to polish or grind their stone tools so as to produce a far more efficient cutting edge, but as yet knew nothing of any metal except gold—used exclusively for ornaments; (3) the Bronze Age, when they learned the use of the first metal used for implements, namely, Bronze, a mixture of Copper and Tin; and lastly (4), the Early Iron Age, when Iron replaced Bronze for all cutting implements. Strictly speaking, we are, of course, still living in the Iron Age.

These four periods are stages of culture rather than measures of time, and though as such they hold good for most of Europe and also probably most of Asia, neither Africa nor America conforms to their scheme. In calculating the age or duration of either of these periods, we have to remember that for different countries, and even, perhaps, for different parts of the same country, the age and duration of the several stages were very different. Egypt, Mesopotamia, and China had, for instance, reached the knowledge of Iron at least 2,000 years before it arrived in Britain. They were, in other words, living in the Iron Age whilst the people of Britain were still in the Neolithic stage. On the other hand the Maori of New Zealand, and the natives of the Pacific Islands were still in the Neolithic stage up to 100 years ago. If we confine ourselves, however, to our own country we may say that the date and the duration of the Palæolithic—the Old Stone Age—when the worked flints found in the Bournemouth gravels were made, can only be approximately guessed at It lasted for many thousands of years, and the climate and conditions of life then were wholly different from those of the present time. Whether there was a gap between the Old and the New Stone Age civilizations, or whether the Neolithic people were direct descendants of the Palæolithic folk, is a matter of dispute. In any case the New Stone Age itself lasted for some thousands of years. Of this age we have abundant remains of the inhabitants themselves in the skeletons found in the Long Barrows of Wilts, Dorset, and Gloucestershire. These are large mounds of earth generally lying east and west, with the larger and higher end to the east. Under this end lie buried the skeletons of the people to whose memory the mound was raised. And from their skulls they are known to have been a "Dolichocephalic" or Long-headed race; that is to say the length of the skull from front to back is great in proportion to its width from side to side These people appear to have been conquered somewhere about 1800 B.C. by a new race coming into Britain from the Continent, either advancing down the Rhine and crossing to the eastern shores of Britain, or possibly coming from Spain by

Brittany to Ireland and the West of England. These people brought with them the knowledge of the use of metals. The first metal to be used for implements was copper, which in its natural form of " Native Copper " can be beaten up, without melting, into a passable blade. In some countries there seems to have been a period when copper was thus used before bronze was known, and this has been called the " Aeneolithic," or " Copper-stone " Age. It is doubtful whether copper alone was ever extensively used in this way in Britain; but two flat knife-daggers, found in barrows in Wiltshire and now in Devizes Museum, have been analysed and found to be of copper, not bronze. Bronze, however, must in any case have been known to the new invaders very soon after they settled in Britain—where tin and copper, its two ingredients, are found close together in Cornwall.

These people buried their dead in Round Barrows as opposed to the Long Barrows of the Stone Age folk whom they conquered. The body was buried with the knees bent and drawn up to the body, and the arms against the chest, in a crouched position, the natural attitude assumed in sleep in a small and crowded hut. The body was laid on its side, and near to the hands was placed a pottery cup—of a peculiar type, not found in Britain before this age. This is known as a " Drinking Cup " or " Beaker," and no doubt contained food and drink necessary for the dead on their journey to the shades. With the dead were also placed their most precious possessions—flat-bladed knife-daggers of bronze; elaborate bead necklaces of red amber and jet-like lignite or shale; gold breast ornaments, ear-rings and beads; and curious thin flat stone or slate " bracers," believed to be wrist-guards to protect the wrist from the blow of the bow-string; also in earlier barrows beautifully fashioned flint daggers, showing how the use of stone overlapped that of bronze. Of gold ornaments of this kind the Wiltshire Downs round Stonehenge and Avebury have produced a larger number than any other district of England, showing that in the Early Bronze Age Wiltshire was the richest and probably the most populous district in Britain. This was doubtless due to the character of the Chalk Downs, then, as now, devoid of trees and open, whilst the valleys were doubtless filled with a tangled mass of forest and morass. Indeed, right down to Saxon times the population on the Downs seems to have been very large, for sites of " Romano-British " villages are scattered everywhere on the high lands, and the Saxons appear to have been the first to settle deliberately in the valleys.

The skulls of the Bronze-using people were " Brachycephalic," or " Short-headed ": that is, they were far broader across in proportion to their length than those of the long-headed people whom they displaced; they were also a taller race.

Gradually it became the custom to burn the dead rather than to bury them; and the burnt bones or ashes were often gathered from the funeral pyre and placed in a cinerary urn of pottery, hand-made without the potter's wheel, as was all the pottery up to that time. These cinerary urns followed certain fashions of make. They were of later date than the " beakers," whose place they took.

Cremation in the later Bronze Age became the rule, though for some time burial and cremation seem to have been practised at the same time and even in the same barrow.

Of these Round Barrows, the vast majority of which are of the Bronze Age, though here and there one occurs of Saxon Age, there are (or were) some 2,000 in Wiltshire. They especially abound round Stonehenge and Avebury, and seem to have some relation to these stone circles, though this has been disputed. In Dorset and round Bournemouth the cinerary urns seem chiefly of the later stages of the Bronze Age and are—speaking generally—of the bucket or barrel type, many being found not in barrows but in open flat cemeteries. These urns are, many of them, marked round the shoulder or the lip with a row of finger-tip impressions by way of ornament. Hitherto they have been generally regarded as distinctly of the Bronze Age, but recent discoveries at All Cannings Cross in Wilts, at Hengistbury Head and elsewhere of large quantities of pottery of many types, apparently intermediate between that of the Middle Bronze Age from the barrows and that of the Early Iron Age as characteristic of the Lake Dwellings of Glastonbury, suggest that they really belong to the age of the overlap of the Bronze and Early Iron Ages.

Somewhere about 800 to 600 B.C. a fresh wave of immigrants from the Continent seems to have reached these shores, possessed of a culture resembling that of the people to whom the remarkable cemetery at Hallstatt in Austria belonged. At that site bronze and iron implements and weapons were found together and the graves were evidently those of a people in whose hands the new fashioned implements of iron had not yet entirely displaced the old fashioned implements of bronze. The period therefore of the overlap of these two stages of culture is generally spoken of as the " Hallstatt " period—the beginning of the " Early Iron Age." This was followed by the " La Tène I " period, when iron had become the usual material of weapons and implements, bronze being still used for ornaments only. This period derives its name from a prehistoric site in Switzerland, where objects of this age were first discovered in any quantity. These finds were characterised by the presence of a fibula, or brooch of the safety-pin type, of a particular fashion. These brooches were also found in numbers in burials in the Department of the Marne in France, associated, in some cases, with objects which could be definitely dated from 400 to 250 B.C.

These brooches were therefore taken as the criterion of the age of deposits in which they were found, and the period thus marked was called that of the earliest La Tène—or " La Tène I." It was the presence of two of these brooches at the All Cannings Cross site in Wiltshire that enabled Captain and Mrs. Cunnington to date the objects there found as not later than " La Tène I " and probably belonging in part to the earlier " Hallstatt " period. Of these La Tène I. brooches some 40 or 50 have been found in Wiltshire, and the majority of the remainder in counties bordering on Wilts. This would seem to show that the connection of Wiltshire with the Continent—possibly by way of the Salisbury and Christchurch Avon—at the beginning of the Early Iron Age was closer than that of other parts of the country. The gradual evolution of this type of brooch in its further stages has been chosen as the mark of the succeeding steps in the Iron Age, known as " La Tène II " and " La Tène III." The earlier of these seems to be the period of many of the pit dwelling settlements of the Wiltshire Downs and of the lake dwellings of Glastonbury and its neighbourhood with their distinctive pottery, whilst " La Tène III " brings us to the threshold of the Roman invasion, which at first interfered little with the prevalence of Celtic fashions in ornament away from the centres of Roman authority. " Late Celtic " is, however, often used as a term descriptive of this time immediately preceding the establishment of Roman power, and is applied more especially to the beautiful bronze and enamel work seen on the shields, the harness (such as was found at Hod Hill) and the weapons of the Belgic tribes of Celts who, in the time of Julius Cæsar, had established themselves in south Britain. This beautiful work which endured for so short a time had a character of its own distinct from anything designed in Britain before or since; and is of itself sufficient to show that the old idea, that the Britons of Cæsar's day were a nation of naked savages, is an entire perversion of the real facts.

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NATURAL
HISTORY.

REV. E. F. LINTON, M.A.

Obituary Notices.

Rev. E. F. Linton, M.A., F.L.S.

Edward Francis Linton, born at Diddington, Hunts, on March 16th, 1848, was the son of the Rev. Henry Linton, sometime Rector of St. Peter-le-Bailey, Oxford. He was educated at Repton and University College, Oxford, where he took Honours in Classics and was one of the founders of the University Chess Club. Ordained in September 1871, he served as Curate of St. Paul's, Preston, for four years, and was then collated by Bishop Fraser to the Rectory of Saint George's-in-the-Fields, but after three years he accepted the living of Sprowston, near Norwich, and during ten years' tenure of that office he found more leisure for his favourite pursuits of Natural History and Geology, and for the study of the Flora of the county. In both of these parishes his energy spent itself in the development of Church buildings and schools, and it was probably the severe work entailed that caused him to seek rest at Bournemouth in 1900. He was one of the moving spirits in the foundation of our Society, occupying at the very beginning the post of Vice-President, and also of Chairman of the Botanical Section. His scientific work thenceforward was set out in full detail twenty years later by Sir Daniel Morris in presenting him with the Morris Gold Medal "in recognition of the valuable services rendered by you during a long period of years in advancing a critical study of the Botany of the Bournemouth area and in view of the many interesting researches you have carried on in the domain of Natural Science." It is unnecessary here to recapitulate such details, which may be found in Vol. XV. of our Proceedings, pp. 28-31.

His botanical work in the South of England was supplemented by frequent excursions to many parts of Scotland, Wales and Ireland. He was a prolific writer and constantly contributed papers to the Journal of Botany. During a large part of his life he was an active and generous contributor to the Botanical Exchange Club, and also to the Watson Exchange Club, of which latter he and his brother were original members in 1884. He was constantly consulted by botanists in all parts of the Kingdom. He gave invaluable assistance both in the identification and distribution of plants sent to the Exchange Clubs, and there must be few Herbaria of importance that have not been enriched by the beautifully prepared specimens that he so liberally supplied. His generous disposition found vent at Bournemouth in voluntary help to the clergy of the neighbourhood, and during the latter part of his life there he became Assistant-Curate at Longfleet, where he made the acquaintance and friendship of that great naturalist, Dr. A. R. Wallace. From 1901 to 1920 he held the living of Edmondsham, in Dorset, where he re-built the Rectory, and made use of a spacious garden for growing and crossing Willows, and where he took up the study of Fungi, contributing the fruits of his research to the Proceedings of the Dorset Field Club. In his clerical work he acted as Commissary to an elder brother, Bishop Linton, the first Bishop of the Riverina Diocese Association. The labours of his useful and active life were by no means confined to his botanical studies, and in his parochial work he proved himself a diligent and sympathetic friend to the poor. A complete Bibliography of his works may be found in the Journal of Botany for March 1928, and our thanks are due to the publishers of that journal for permission to reproduce the appended portrait and to draw from the Obituary Notice in that number.

Alderman J. E. Beale, J.P.

The death of Alderman Beale recalls to memory a chapter in the early history of the Society, for he was one of its original members, and, indeed, its first President. He was not a man of Science; but for a new, and perhaps perilous, venture it was felt that no more suitable sponsor could be found than the Mayor of the Borough, and the Society was duly launched under his auspices at a Conversazione, at which he presided, in the Havergal Hall, on November 28, 1903. He remained a member for six years, until the Society was firmly established, and the development of the town, so largely due to his enterprise and wisdom, engaged his whole attention.

Mr. H. E. Swain.

We have to record the loss of another valued member of the Society. During many years Mr. Swain gave most efficient help to the Botanical Section, arranging and classifying the whole of the Herbarium specimens, comprising between three and four thousand sheets. He joined the Society in 1911 and was elected an Honorary Member in 1922.

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Historical Lists of Officers of the Society.

COMPILED BY THE LATE MR. R. A. DE PAIVA.

Presidents

1903-4	J. E. BEALE (Mayor of Bournemouth).
1904-5—1905-6 ...	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-8—1908-9 ...	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1909-10	DR. A. SMITH WOODWARD, F.R.S., F.L.S., F.G.S.
1910-11	DR. DUKINFIELD H. SCOTT, M.A., F.R.S., F.L.S., F.G.S.
1911-12 — 1912-13	SIR E. RAY LANKESTER, K.C.B., M.A., LL.D., F.R.S., F.L.S.
1913-14 — 1914-15 —1915-16	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1916-17	THE RT. HON. THE EARL OF MALMESBURY, D.L., J.P.
1917-18	SIR JETHRO J. H. TEALL, M.A., D.SC., LL.D., F.R.S.
1918-19 — 1919-20	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S.A.
1920-21	LT.-COL. SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S.
1921-22 — 1922-23	F. G. PENROSE, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1923-24	SIR F. W. KEEBLE, K.B.E., D.SC., F.R.S.
1924-25 — 1925-26	HUBERT PAINTER, B.SC., F.C.S.
1926-27 — 1927-28	HEYWOOD SUMNER, F.S.A.
1928-29	CLAUDE LYON.

Vice-Presidents

1916-	H. BACKHOUSE, F.R.H.S.
1905-14	G. BROWNEN, F.C.S.
1906-	G. E. J. CRALLAN, M.A., M.B., M.R.C.S.
1921-25	FIELD MARSHALL LORD GRENFELL OF KILVEY, G.C.B., G.C.M.G., LL.D., F.S A.
1904	E. HYLA GREVES, M.D., M.R.C.P.
1914-16	G. G. HAMILTON, F.R.C.S., F.R.H.S.
1910-12	C. J. HANKINSON, J.P.
1914-23	S. MCCALMONT HILL, D.C.L.
1905-20	J. E. LIDDIARD, F.R.G.S.
1904-28	REV. E. F. LINTON, M.A., F.L.S.
1918-28	CLAUDE LYON
1916-	SIR DANIEL MORRIS, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1912-22	W. T. ORD, F.G.S.
1916-24—1926 ...	HUBERT PAINTER, B.SC., F.C.S.
1916-21—1923- ...	F. G. PENROSE, M.A., M.D., F.R.C.P., F.Z.S., M.B.O.U.
1909-21	A. RANSOME, M.A., M.D., F.R.C.P., F.R.S.
1907-18	MISS C. AGNES ROOPER
1904-8	W. SAVILLE-KENT, F.L.S., F.Z.S., F.R.M.S.
1916-	R. VOWELL SHERRING, F.L.S.
1918-25	REV. H. SHAEN SOLLY, M.A.
1905-11	A. W. THOMAS, M.D.
1905-16	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-14	H. J. WADDINGTON, F.L.S.
1928-	REV. C. O. S. HATTON, B.A., F.L.S.
1928-	HEYWOOD SUMNER, F.S.A.
1928-	HENRY BURY, M.A., F.L.S., F.G.S.

Chairmen of Committee

1904-5	J. ROBERTS THOMSON, M.D., F.R.C.P., J.P.
1905-6	J. E. LIDDIARD, F.R.G.S.
1906-7	H. J. WADDINGTON, F.L.S.
1907-10	W. T. ORD, F.G.S.

Chairmen of Council

1910-11	W. T. Ord, F.G.S.
1911-14	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1914-Dec. 15	G. G. Hamilton, M.A., F.R.C.S.
1916-17	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1917-Feb. 19	W. Munn Rankin, M.SC., B.SC.
1919-Mar. 20	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
1920-22	Hubert Painter, B.SC, F.C.S.
1922-27	J. H. Ralph Smythe, J.P.
1927-	Rev. C. O. S. Hatton, B.A., F.L.S.

Deputy Chairmen of Council

1911-14	G. G. Hamilton, M.A., F.R.C.S.
1914-Feb. 16	Henry Backhouse, F.R.H.S.
1916 Mar.-Nov. 16	R. O'B. Furlong, C.B., J.P., M.A.
1916 Dec.-17	W. Munn Rankin, M.SC., B.SC.
1917-19	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1919-20	Hubert Painter, B.SC., F.C.S.
1920-22	J. H. Ralph Smythe, J.P.
1922-27	Rev. C. O. S. Hatton, B.A., F.L.S.
1927-28	J. H. Ralph Smythe, J.P.
1928-	Claude Lyon

Hon. Treasurers

1904-8	A. D. George.
1908-	G. Brumell, A.R.I.B.A.

Hon. Secretaries

1904-7	Miss C. Agnes Rooper and J. R. L. Dixon, M.R.C.S., L.R.C.P.
1907-8	J. R. L. Dixon, M.R.C.S., L.R.C.P., and H. Backhouse, F.R.H.S.
1908-10	J. R. L. Dixon, M.R.C.S., L.R.C.P., and Col. E. E. Markwick, C.B., C.B.E., F.R.A.S.
1910 Sept.-Oct.	J. Donkin, F.R.I.B.A.
1910-11	H. Le Jeune.
1911 Nov.-Feb. 1912	Sir A. Brooke Pechell, BART., M.B.
1912 Apr.-Mar. 1914	T. Michell, M.I.C.E.
1914 Apr.-Oct.	R. A. de Paiva.
1914 Oct.-July 1917	R. A. de Paiva and T. Capper, M.A., B.SC., Joint Secretaries.
1917 July-25	R. A. de Paiva.
1925-26	R. A. de Paiva and Rev. A. G. Yates, M.A., R.N., Joint Secretaries.
1926-	Rev. A. G. Yates, M.A., R.N.

Hon. Assistant Secretaries

Apr. 1911-1912	T. Michell, M.I.C.E.
May Mar. 1912-1914	R. A. de Paiva.
1917-1918	G. G. Grace, B.SC., A.R.C.SC., F.E.S.
1919-1920	W. G. Boul, M.A., LL.D., D.C.L.
1920-	W. J. Woodhouse, A.C.P., M.I.H.

Hon. Financial Secretary

1905-8	J. H. Scott, M.E., M.I.M.C.E.

Assistant Secretary

1909-	J. F. Spencer.

Hon. Librarians

1908-1909	A. Scott, b.a.
1909-1911	F. I. Cooke.
1911-1912	W. Munn Rankin, m.sc., b.sc.
1913-1919	H. J. Ellis.
1919 Oct.- Mar. 1920	J. Omer Cooper, f.e.s.
1920 Mar.- Jan. 1921	Rev. C. O. S. Hatton, b.a., f.l.s.
1921 Jan.-	Claude Lyon.
1923-	Miss A. G. Veale, Hon. Assistant Librarian.

Hon. Editors

1911-12	G. E. J. Crallan, m.a., m.b., m.r.c.s.
1912-20	Hubert Painter, b.sc., f.c.s.
1920-25	F. B. Taylor, b.a.
1925-	J. R. White, m.a.

Hon. Curators

1917 Jan.- July 1921	W. G. Wallace.
1921-Dec. 1922	No Curator.
1923 Jan.-Nov.	Rev. C. O. S. Hatton, b.a., f.l.s., and Howard Lacey, b.a
1923 Dec.-	Rev. C. O. S. Hatton, b.a., f.l.s.

Chairmen of Sections.

Antiquarian

1904-7	A. W. Thomas, m.d., m.r.c.s.

Archæological and Historical

1907-8	A. W. Thomas, m.d., m.r.c.s.
1908-Feb. 14	G. Brownen, f.c.s.
1914 May-Nov.	Rev. Canon T. E. Usherwood, m.a.
1914 Dec.-24	Rev. H. Shaen Solly, m.a.
1924-26	Col. J. R. Dodd, m.d., f.r.c.s.
1926-	R. K. Cardew, b.a.

Deputy Chairmen

1922-24	Col. J. R. Dodd, m.d., f.r.c.s.
1925-26	R. K. Cardew, b.a.

Astronomical

1920-24	Col. E. E. Markwick, c.b., c.b.e., f.r.a.s.
1925-26	G. E. J. Crallan, m.a., m.b., m.r.c.s.
1928-	L. B. Benny, m.a., b.sc., f.r.a.s.

Deputy-Chairman

1927-28	L. B. Benny, m.a., b.sc., f.r.a.s.

Mathematical

1921-22	W. H. Scott, m.a
1922-24	B. M. Peek, m.a., f.r.a.s.

Astronomical and Mathematical

1924-25	B. M. Peek, m.a., f.r.a.s.

Botanical

1904-5	Rev. E. F. Linton, m.a., f.l.s.
1905-7	J. F. Rayner, f.r.h.s.
1907-May 18	Miss C. Agnes Rooper.
1918-22	Rev. C. O. S. Hatton, b.a., f.l.s.
1922-26	Howard Lacey, b.a.
1926-27	Rev. C. O. S. Hatton, b.a., f.l.s.
1927-	L. Beeching Hall, f.l.s.

Entomological

1914-15	R. Beck, F.E.S.
1915-Dec. 19	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1920-Jan. 26	J. Neale, B.A.
1926-	Howard Lacey, B.A.

Geographical

1908-10	J. E. Liddiard, F.R.G.S.
1910-11	A. Scott, B.A.
1911-16	G. de Castro, M.R.C.S.
1916-	Claude Lyon.

Geological

1904-5	Rev. G. D. Shenton, B.A.
1905-6	The Marquis de Trevelec.
1906-14	W. T. Ord, F.G.S.
1914-17	W. Munn Rankin, M.Sc., B.Sc.
1917-18	H. Kidner, F.G.S.
1918-20	W. Munn Rankin, M.Sc., B.Sc.
1920-23	W. J. Woodhouse, A.C.P., M.I.H.
1923-	Henry Bury, M.A., F.L.S., F.G.S.

Photographic

1905-8	Councillor R. Y. Banks.
1908-10	C J. Hankinson, J.P.
1910-12	E. W. Barlow, F.R.A.S.
1912-13	G. Brumell, A.R.I.B.A.
1913-14	No Chairman.
1914-16	R. Y. Banks.

Photographic and Record

1916-25	R. Y. Banks.
1925-	W. Dieselhorst, A.M.I.C.E.

Physical

1904-26	Hubert Painter, B.Sc., F.C.S.
1928-	G. E. J. Crallan, M.A., M.B., M.R.C.S.

Deputy Chairman

1926-28	G. E. J. Crallan, M.A., M.B., M.R.C.S.

Zoological

1904-8	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1908-10	A. W. Thomas, M.D., M.R.C.S.
1913-14	W. Munn Rankin, M.Sc., B.Sc.
1922–	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Microscopical

1909 Mar.-10	J. R. L. Dixon, M.R.C.S., L.R.C.P.
1913-14	H. B. Wells, F.R.M.S.
1922-	F. B. Taylor, B.A.

Zoological and Microscopical

1910-11	H. B. Wells, F.R.M.S. A. W. Thomas, M.D., M.R.C.S.
1911 Mar.-12	G. E. J. Crallan, M.A., M.B., M.R.C.S.
1911-13	H. B. Wells, F.R.M.S.
1914-16	T. B. Goodall, F.R.C.V.S., F.L.S.
1916-22	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.

Elected and co-opted Members of Council.
Title changed from Committee in 1910.

Many of these also had seats on the Council ex-officio either before or after their election or co-option. Their names are marked*

1905-7	Atkins, Dr. F.
1906-7—1908- ...	*Backhouse, H., F.R.H.S.
1914-15	*Banks, R. Y.
1905-6	Bax, P. B. Ironside.
1904	Bond, Dr. Eleanor.
1919-20	Boul, Mrs.
1904-8	*Brownen, G., F.C.S.
1906-8	*Brumell, G., A.R.I.B.A.
1906-8	Buckland, Dr. Frank.
1921-22	Cardew, R. K., B.A.
1909-11	Chandler, S. Whitty, B.A.
1905-6	Clements, Lt.-Col. W. G.
1904	Clift, Dr.
1921-28	Curme, Mrs.
1905-10	Curtis, W. Parkinson, F.E.S
1923-26—1927- ...	*Dodd, Col. J. R., M.D., F.R.C.S.
1914-16	Druitt, J., J.P.
1916-17	Dyer, J. Herbert.
1919-25	*Ellis, H. J.
1910-	French, J. M.
1914-17	Furlong, R. O'B., C.B., M.A.
1919-Aug. 21 ...	*George, A. D.
1904	Giles, Dr.
1904-6	*Goodall, T. B., F.R.C.V.S., F.L.S.
1918-20	Gosse, W., M.D., D.P.H.
1921-23	Gray, Arthur.
1910-15	Hamilton, G. G., M.B., F.R.C.S.
1916-18 — 1922-23	Hatton, Rev. C. O. S., B.A., F.L.S.
1911-16	Hill, S. McCalmont, D.C.L.
1926-	Hurry, J. B., M.A., M.D.
1916-19	Jeffery, T. J. P.
1906-10 — 1911-18	*Le Jeune, H.
1926-	Longbottom, F. W., F.R.A.S.
1914-16	*Lyon, Claude.
1907-8	*Markwick, Col. E. E., C.B., C.B.E., F.R.A.S.
1907-8	Maude, W. C., J.P.
1910-16	*Morris, Sir Daniel, K.C.M.G., J.P., M.A., D.SC., LL.D., F.L.S.
1910-11	*Michell, T., M.I.C.E.
1916-19	*Neale, Joseph, B.A.
1905-6	*Ord, W. T., F.G.S.
1904	Parish, Miss
1915-16	*Penrose, F. G., M.D., F.R.C.P., F.Z.S., M.B.O.U.
1917-18	*Rankin, W. Munn, M.SC., B.SC.
1904	Reid, C. J.
1919-	Rooke, Miss S. G.
1918-19	Rothwell, Mrs.
1908-9	Scott, A., B.A.
1908- ...	*Scott, J. H., M.E., M.I.M.C.E
1904-26	Sherring, R. Vowell, F.L.S.
1920-27	Simpson, Rev. E. J. Douglas, M.A.
1916-	Smythe, J. H. Ralph, J.P.
1923-	*Spencer, J. F.
1905-10	Stubbs, G. M.
1918-20	*Taylor, F. B., B.A.
1921-23	*Wallace, W. G.
1907-10	*Wells, H. B., F.R.M.S.
1906-7 — 1916-20 1923-	*Woodhouse, W. J., A.C.P., M.I.H.

Various Committees

Chairman: Rev. C. O. S. Hatton, B.A., F.L.S.

1915 Dec.-Oct. 1919	General Policy of the Society.
1919 Nov.-Feb. 1920	Housing.
1920 Feb.-Oct. 1922	Housing and Finance
1922- ...	Finance and General Purposes.

Library Committee

Chairmen

1918 Mar.-Oct. 1918	G. G. Grace, B.SC., A.R.C.SC., F.E.S.
1918 Nov.-Oct. 1919	Hubert Painter, B.SC., F.C.S.
1919 Nov.- ...	Rev. C. O. S. Hatton, B.A., F.L.S.

Museum Committee

Chairmen

1917-1921 ...	W. G. Wallace.
1921- ...	Rev. C. O. S. Hatton, B.A., F.L.S.

Hon. Auditors.

1906-9	H. Sutton and K. H. Mundell.
1909-14	H. Sutton and E. Bicker.
1914-15	E. Bicker and H. Backhouse, F.R.H.S.
1915-17	E. Bicker and E. W. Barlow, F.R.A.S.
1917-	E. Bicker and C. H. Blackett.

Committees for the current Year 1928-29.

Finance and General Purposes

Rev. C. O. S. Hatton, B.A., F.L.S. (Chairman)
H. Backhouse, F.R.H.S.
The Hon. Treasurer (G. Brumell, A.R.I.B.A.)
J. M. French
The Hon. Secretary (Rev. A. G. Yates, M.A., R.N.)
F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
Claude Lyon.

Library

Rev. C. O. S. Hatton, B.A., F.L.S. (Chairman)
F. G. Penrose, M.D., F.R.C.P. F.Z.S., M.B.O.U.
H. Backhouse, F.R.H.S.
G. E. J. Crallan, M.A., M.B., M.R.C.S.
Claude Lyon (Hon. Librarian)
Miss A. G. Veale
J. R. White, M.A.

Museum

The Hon. Curator (Chairman) (Rev. C. O. S. Hatton, B.A., F.L.S.)
Chairman of Archæological Section (R. K. Cardew, B.A.)
Chairman of Botanical Section (L. Beeching Hall, F.L.S.)
Chairman of Entomological Section (Howard Lacey, B.A.)
Chairman of Geological Section (Henry Bury, M.A., F.L.S., F.G.S.)
Chairman of Zoological Section (F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.)
G. E. J. Crallan, M.A., M.B., M.R.C.S.

Editorial

The Hon. Editor (Chairman)
(J. R. White, M.A.)
The Hon. Treasurer
(G. Brumell, A.R.I.B.A.)
The Hon. Secretary
(Rev. A. G. Yates, M.A., R.N.)
G. E. J. Crallan, M.A., M.B., M.R.C.S.
Henry Bury, M.A., F.L.S., F.G.S.

Garden

Rev. C. O. S. Hatton, B.A., F.L.S.
H. Backhouse, F.R.H.S.
J. B. Hurry, M.A., M.D.
Miss S. Wetherell
L. Beeching Hall, F.L.S.
Miss S. G. Rooke.

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BRITISH MUSEUM
18 APR 29
NATURAL HISTORY.